NOTES ON PHTHISIS PULMONALIS IN GENERAL PRACTICE WITH SPECIAL REFERENCE TO TREATMENT.

THESIS

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The treatment of phthisis has become so highly specialised that comparatively few cases are treated from the beginning to the end by general practitioners.

The cases which general practitioners do treat may be divided into three main classes:

1. Pre-Sanatorium: This class includes early cases suitable for Sanatorium treatment before they go to a Sanatorium.

2. Post-Sanatorium: This class includes phthisical cases who have been in a Sanatorium, have come home, and require treatment from their own doctor.

3. Non-Sanatorium: This class consists of patients who are too far advanced in phthisis to be likely to derive much benefit from Sanatorium treatment.

A fourth class might be added consisting of patients affected with phthisis, who are able and desire to remain at work. In this category may also be placed patients who are suitable for a sanatorium, are unfit for work, but who object to go. This latter class, although small, is not negligible.

Previous to Koch's discovery of the Tubercle Bacillus in 1882, as the cause of phthisis, the treatment of this disease was largely by drugs, and general advice as to rest and diet, and, to a smaller extent, hygiene. After the discovery of the bacillus, Tuberculin was introduced by Koch, and drug treatment began to wane.

The development of treatment by Tuberculin, by either Koch's or Wright's methods, almost ousted other forms of treatment.

The value of Sanatoria also became more widely appreciated about/

about this time. Tuberculin remained the key-note of treatment until a few years ago.

After extensive trials of Tuberculin, extending over 30 years, the profession has realised that it is no panacea, although it is generally admitted to be of great value in a great many cases, and other forms of treatment have been resorted to. Treatment by Tuberculin is also restricted in general practice by difficulties of nursing, and constant observation of promiscuous rises in temperature, and of the opsonic index, and subjective symptoms.

The writer has had the opportunity of treating a number of cases of phthisis in general practice, and of observing the effects of various drugs.

In the present thesis, it is proposed to give an account of personal observations in a series of 8 cases treated at home.

HISTORICAL OUTLINE.

Tuberculosis has been recognised and treated under different names from the earliest times of which we have medical records. For centuries the objective features alone attracted attention. Nothing was known of the morbid appearance or the cause. Before Hippocrates, Democritus wrote a book entitled "On those who are attacked with a cough after illness". Hippocrates described the disease some 350 or more years B.C., but does not appear to have recognised its infectious character. He recognised the disease as a fever, and its association with haemoptysis and pleurisy, and gave a good description of the appearance of the chest in phthisis, and noted the bulbous fingers.

The cause was considered to be dropping of the pituita from the head into the lungs, and producing ulceration and fever.

Galen in the 2nd century A.D. probably recognised that it was infectious. Other writers about the time of Galen were Aretaeus and Celsus. The importance of climate and diet was recognised by these early writers.

There does not appear to have been any marked increase in the knowledge of the disease or improvement in treatment from the time of Galen until the 17th century.

Nodules in the lungs were recognised and described by F. D. Sylvius (614-672). He was the first of whom we have record who connected these nodules with phthisis or consumption.

"Consumption"/

"Consumption" in ancient times had a very much wider meaning than what we at the present time mean by Phthisis Pulmonalis. The name "consumption" was applied to any wasting condition in which there was troublesome cough.

Sylvius thought that the nodules found in the lungs in phthisical cases were enlarged glands following on a scrofulous constitution, and knew they broke down to form cavities.

It is interesting to note that in country districts, in the last century, enlarged lymphatic glands, especially in the groin, in growing or "waxing" children and in people in their "teens", were called "Waxing kernals", and were considered to be of a scrofulous nature. "Millet Seeds" or miliary tubercles were named by Magnetus in 1700, and he found them not only in the lungs but in other structure and organs.

In the 18th century various writers added to the literature on phthisis. Thomas Reid thought that tubercles were not enlarged glands but exudation products. Doubts had previously been cast on the glandular theory by Morgagni. Matthew Baillie (1793) thought that large nodules, or masses of nodules, were due to coalescence of the smaller ones, and described their consistence as hard'and containing thick pus.

These observers were working under very great disadvantages, as post mortems were not frequently made, the microscope had not yet been developed, and the germ theory of disease did not exist.

Early in the 19th century Bayle (1774-1816) from observations of 109 autopsies, concluded that phthisis required a special tendency for its development, and he probably concluded that that special/

special tendency or idiosyncrasy was hereditary, or at least congenital - for example a scrofulous constitution. Bayle described the degeneration of the tubercles, and ? the formation of "cold abscesses". Bayle was the founder of the modern pathology of tuberculosis, and looked on the miliary tubercle as the starting point.

After Bayle his pupil Laennec held that phthisis developed from tubercle, and was not caused by catarrhal inflammation of the bronchial system. About the same time as Laennac, Niemeyer said "The greatest danger to which a phthisical patient is exposed is that of becoming tuberculous".

At the end of the 18th and beginning of the 19th century, phthisis and tuberculosis were considered as separate diseases, and might, or might not, co-exist in the same patient, but it was evidently recognised that there was a close relationship between them, and the credit of this largely due to Sylvius (vide ante).

Histology was developed early in the 19th century, and applied to pathological study, and was a very great help in the study of phthisis. The pathology of phthisis was studied by Kebert, Rokitansky, Virchow, Buhl and Klenke. Kebert found "bodies" or "corpuscles" in tubercles in 1844.

Rokitansky believed in tuberculous Diathesis.

Virchow in 1847, thought that tubercles were not due to a specific virus, but were secondary to inflammatory changes, and that caseation was not confined to tuberculosis. This theory was confusing and was a set-back in the pathological study of phthisis.

In 1789 Kortum experimented with inoculation of scrofulous material/

material.

In 1826, Cruvelhier did inoculation experiments, but thought tuberculosis resulted from various substances and was not specific.

Buhl in 1857 (Newsholme) said in a very large proportion of cases, phthisis was secondary to tuberculosis elsewhere in the body, and was the first to formulate the theory of auto-infection from miliary tubercles in various parts of the body, such miliary tubercles having arisen from foci of caseous matter. About this time experiments on animals were used.

In 1843 Klenke caused tuberculosis of the liver and lungs rabbits by injection of cells from miliary tubercles.

Villemin experimented on rabbits and other animals, and in 1865 summarised his ideas from his results in his note to the Academie de Medicine as follows:

"Tuberculosis is the effect of a specific causal agent, in short of a virus. This agent must reside, like its congeners, in the morbid products formed by its direct action on the normal elements of the affected tissues. Introduced into an organism susceptible to its action it must continue to reproduce itself, and at the same time to reproduce the disease of which it is the essential principle and the determining cause". Experiment has confirmed these results of induction.

Villemin said further that "Tuberculosis is a specific affection caused by an inoculable agent. Tuberculosis then belongs to the class of virulent diseases, and in the nosological scheme must take its place beside syphilis, small pox, scarlet fever, but closer still to Glanders".

Villemin's/

Villemin's work was severely criticised by the Academie, and it was contended that some of the rabbits used might already have been tuberculous. He made further experiments on animals of different species, including some birds, and found that some species, e.g. guinea pigs, rabbits, etc., were susceptible, while others, e.g. pigeons, were not susceptible.

Villemin proved the specificity of the disease. Burdon-Sanderson in 1868-9 confirmed Villemin's results by experiments.

It had been found that tuberculosis followed the injection of apparently non-tuberculous material, and it was a controversial point whether trauma alone could induce it. After experiments on guinea pigs, Burdon-Sanderson decided that tuberculosis would not follow simple trauma, even if severe, if air was excluded from the injured part. He also found that the introduction of setons soaked in Carbolic Acid did not cause tuberculosis.

In 1877 Cohnheim proved the inoculability by inoculating tuberculous material into the anterior chamber of the eye of a rabbit. He eliminated previous sources of error, and gave proof of the specificity of tuberculous material.

Klebs was the first on record to undertake feeding experiments with tuberculous material, and cultivated a virus on egg albumen through several generations. He narrowly missed the detection of the bacillus.

Other experimenters had introduced materials, pus, etc., which they thought were non-tuberculous, and found that tuberculosis frequently followed. The probability is that they had unwittingly introduced tuberculous material, or that the animal had/

had dormant tubercle.

Other observers about this time concluded that tuberculosis was of a specific origin. William Marcet suggested inoculating guinea pigs for diagnostic purposes, with sputum of cases of suspected tuberculosis, because he found that the injection of non-tuberculous bronchitic sputum into guinea pigs did not cause tuberculosis.

In or about the year 1872, Dr. Andrew Smart of Edinburgh wrote a book on the Rinderpest for the Edinburgh City Council. This book was translated into various languages, and there can be little doubt that it had an influence on the study of the germ theory of disease, and was really pioneer work in this direction. He also wrote a little book called "Dust Germs and Disease."

In the "eighties" Pasteur was working on bacteria and their staining properties. He found out that bacteria stained deeply by basic aniline dyes, but was unable to find bacteria in tuberculous nodules.

To Robert Koch is due the discovery of the Tubercle Bacillus. In 1882 Koch, through the Physiological Society of Berlin, published his note on "The Discovery and Cultivation of the Bacillus of Tuberculosis."

He described his failure to grow the organism on agar, gelatine, etc., and how he succeeded at last by using coagulated blood serum as an artificial medium.

He used material from animals dying from recent tuberculosis, also material from tuberculous lung cavities, and from lupus. He collected the tuberculous material by means of a platinum/

platinum loop, rubbed it up on blood serum and incubated at blood heat. At the end of a few days he noticed a few dull white specks on the surface of the medium, which specks increased in size daily and became confluent. The serum was not liquified nor even penetrated. He tried to stain the bacilli with aniline dyes, but found this method was not satisfactory. Aniline dyes gave a beaded appearance like spores. Later hewwas successful in staining the bacilli by prolonged soaking (on a coverslip) in alkaline methylene blue, and using a brown contrast stain. Thus he isolated and was able to cultivate the tubercle bacillus, which had baffled scientists for many centuries.

After his great and valuable discovery, Koch endeavoured to use it for practical therapeutics, and further researches led him to the discovery of old Tuberculin. This is really the first record of the principle of Serum Therapy.

Koch experimented on animals by giving sub-cutaneous injections of active tubercle bacilli into both healthy and tuberculous subjects, and found the results very different.(6)

He found that when a healthy guinea pig was thus inoculated with a pure culture, although there was no immediate morbid result, in from 10 to 14 days a hard nodule appeared, which later broke down and ulcerated, and so persisted until the animal died. When he inoculated a tuberculous guinea pig, no nodule appeared but the site of inoculation became hard and altered in colour; necrosis followed; dead tissue was cast off, and a flat ulcer was left which rapidly healed. There was no secondary glandular affection.(7)

This difference in the effect of injections on healthy and tubercular animals pointed to a degree of immunity having been set up by the first infection. Having noted the results, Koch experimented with a non-concentrated broth filtrate from a pure culture of human tubercle bacilli. He considered this filtrate tooweak and discarded it for a stronger preparation "original Tuberculin", known familiarly as "O.T."

He advocated the administration of "O.T." in early cases only, beginning with 1 mgm doses, to be repeated till there was no reaction. Then larger doses were to be given in the sameway. When there was no further reaction with larger doses, he believed healing was accomplished. He gave up this view later.

In 1890, Koch was so satisfied with his results that he thought and announced that in Tuberculin he had discovered a cure for Tuberculosis. After this Tuberculin was administered to all sorts of tuberculous cases, and many very bad results followed. Then a reaction set in against Tuberculin, and it was largely given up. Its continued use is largely due to such men as Trudeau, Goetsch, Klebs, Petruschky, Von Ruck, and Sir R. W. Philip of Edinburgh.

After many trials of O.T. it was considered that it contained both a therapeutic and a toxic agent. In addition to the clinical and experimental trials, much chemical work was done on O.T., in the hope of separating the beneficial from the harmless substance. Hunter, in 1891, obtained a substance which he considered superior to O.T., by treating O.T. with Ammonium Sulphate. Trudeau used the same procedure with the broth filtrate. Neither Hunter's nor/

nor Trudeau's preparations proved to be better than O.T. Klebs, working on the same lines, believed that by treating O.T. with Bismuth Iodide and filtering off the precipitate, and by further precipitation by alcohol, he was able to produce the therapeutic without the toxic agent. This substance (Tuberculocidin) was not much used.(a)

Koch realised that O.T. did not produce perfect immunity to tuberculosis, and he also tried to separate the beneficial from the harmful part. He made an extract with Sodium Hydrate which he called Tuberculin Alkalinum (T.A.). He found that T.A. produced abscesses and discarded it. After further experiments he produced a new tuberculin, Tuberculin Residuum (T.R.). This consisted of an emulsion of pulverised, water extracted, virulent tubercle bacilli. The water extract was considered to contain fever-producing substances, and was not to be used. He called the watery extract Tuberculin Obere (T.O. The results of T.R. were not satisfactory.

In 1901 Koch recommended an emulsion of tubercle bacilli to be given in increasing doses, subcutaneously at first, and later, if necessary, intra-venously. The modus operandi was considered to be by serum agglutination. The discovery and use of this emulsion was important, and led to the "Tuberculin Renaissance" and many Tuberculins have since been used.

In the beginning of the 20th century much work was done in regard to Tuberculin. Many observers, e.g. Vaughan and Wheeler, Livierato, Klebs, Philip, and others, claimed to have obtained bacteriolitic/

bacteriolitic action. At this time (early in the 20th century) Tuberculin in any form as a therapeutic agent was still in a doubtful position. Much had been expected, but the effects in different cases had been so different that disappointment was felt. Early in the history of tuberculin the improvement in many old stand tubercular affections, e.g. lupus, was remarkable. Koch's warning had been forgotten or disregarded, and large doses of tuberculin were given in advanced phthisis and quiescent cases, and frequently very bad results followed.

Sir A. F. Wright did valuable work on the "Opsonic Theory", when working on the subject of immunity.(8) From his observations on the effect of vaccine administration, he found there was produced first a negative phase of variable duration, according to the dose, and after the negative there was a positive phase, in which the anti-bacterial power of the serum was raised. In the case of Tuberculin he found the positive phase lasted about a month. He deprecated frequent injections as of no avail, but rather harmful on account of cumulative depression. He used very small doses of (generally) New Tuberculin, and got very good results in many forms of localised tuberculosis, e.g. lupus. He has not used his method extensively in phthisis.

In using Tuberculin various points have to be considered in order to avoid risks and get the best results, in addition to the selection of suitable cases:-

1. The choice of site of injection is important. Koch advised the area of skin of the back, between the shoulder blades, on account of the folds of the skin. Bandelier and Roepke preferred/

ferred the forearm, but the skin here being somewhat tight, there is danger of painful infiltration, also of damaging small veins, and of injecting into the blood stream direct, in which case severe reaction may supervene.

Carl Spengler (Bandelier and Roepke "Tuberculin in Diagnosis and Treatment") uses the extensor aspect of the forearm in which it is easy to study local phenomena, and regulate the number of injections. The injections should be subcutaneous, not into the skin itself, otherwise pain and oedema are likely to occur.

2. Strict asepsis is absolutely necessary.

3. The type of syringe used is also important. An all-glass syringe is probably the best, being easily sterilised. The barrel should be long so as to allow of careful graduation.

4. Dosage and frequency are of great importance, so as to avoid serious reaction, and yet to increase the doses regularly. Each case must be studied separately. From 1/10 to 1/1,000 milligram is an average initial dose of O.T. Frequency varies from daily doses to once a week, according to the condition of the patient, and the dose may go up to 5 mgms.

5. The condition of the patient, as evidenced by the general strength and temperature, and if possible the opsonic index, must be carefully noted before using tuberculin.

6. The effect of each dose must be carefully noted, and if there is much reaction a longer interval is given, and the previous dose.

7. The body weight and pulse rate, and the condition of the chest must be carefully watched. The length of time for tuberculin treatment varies very much in individual cases.

The German method of using Koch's New Tuberculin is somewhat different from the procedure with O.T. New Tuberculin is used entirely for treatment, and the physician aims at absence of reaction during the whole course of treatment. An average initial dose is 2/1000 milligram. Reaction after this dose is unlikely, but may occur in very severe cases, in which event a much smaller dose is given. When no reaction occurs the dose is gradually but rapidly increased up to 1 milligram. After 1 mgm is given without reaction the doses are further increased by 2 and later by 3 and 5 milligrams at a time, the maximum dose being 20 mgms. The intervals are as with O.T., i.e. from 1 to 7 or more days.

The duration of treatment by this method various considerably with individual cases. Petruschky considers 2 years a minimum period. Intra-venous injections of specially prepared bacilliary emulsion have been used in Germany, but reaction is frequently severe. This method is mostly used after a subcutaneous course to increase the maximum dose and produce further immunity.

Other methods of administering Tuberculin in Germany have been "Lung Infusion", inhalation by the mouth, rectal, and per cutem. None of these have met with favourable criticism, and the subcutaneous method is the one most generally favoured.

To summarise shortly, the German method of using T.R. is to begin with a small dose (0.002 mgms to .0002 mgms) rapidly increasing until 1 mgm then 10 and finally 20 mgm has been reached, the guide to the treatment being frequent observation of temperature.

Wright's/

Wright's Method: The English method as practised by Sir A. E. Wright, is carried out on a different plan from the German method.

Sir A. E. Wright did a great deal of work on the subject of the opsonic index, which really means the power of resistance of the patient against bacteria and their toxins, in other words the degree of immunity, or susceptibility, as the case may be. He found from experiments that inoculation with a microbe vaccine is followed by three phases of variation of the opsonic index:-

1. At first there is a fall in the index, called the negative phase.

2. This is followed by a rise above normal, called the positive phase.

3. The third phase is a return to normal.

He found that if one or more injections are given during the negative phase, that a still further fall, or loss of resisting power, results, and that this fall in the index is cumulative according to the number of injections given (vide ante). He also found that inoculations given during the positive phase do not produce a cumulative rise in the index.

The object aimed at in both the English (or Wright's) and German method is immunity. The German method is to give doses in geometrical ratio, which Wright says is wrong in theory and should be harmful in practice. Wright, from his work on the opsonic index, considers that immunity by tuberculin is best obtained by the following:

1./

1. Using the smallest dose which will produce a result.

2. Repeating the dose only when the effect has passed off.

3. Increasing the dose only when no effect is produced by the old dose.

4. Having due regard to the length of the negative phase, and regulating the series of doses accordingly.

Wright's method has been successful in surgical tuberculosis. It has not been much used in phthisis. Moth methods of using Tuberculin (English and German) have their adherents.

The varieties of Tuberculin which have the greatest support clinically are:

1. Old Tuberculin (Koch). This is a beef broth culture, containing glycerine, neutralised, human tubercle bacilli, boiled for an hour, concentrated to 1/10 its volume, and filtered through a Chamberlain filter. The finished product contains 50% glycerine. (10)

2. Tuberculin R. (Koch). An unheated, 20% glycerine emulsion of living, pulverised, virulent tubercle bacilli, which have just been extracted with water (water abstract named Tuberculin Obere), containing finally in each c.c. 10 mgm of solid substance. (11)

3. Bacillus Emulsion, B.E. (Koch). An unheated, 50% glycerine emulsion of living, virulent, pulverised tubercle bacilli, containing 5 mgm of solid substance in each c.c. The coarser particles are removed by centrifugalisation.

4. Tuberculocidin (T.C.) and Antiphthisin. O.T. is first precipitated with Bismuth and then with Alcohol to make Tuberculocidin. To make Antiphthisin, O.T. is first precipitated with Potassium-Bismuth-Iodid, in acetic acid, and then with alcohol.

5. "Watery Extract" (Von Ruck). Tubercle Bacilli are washed with water, then first extracted with alcohol and ether pulverised and finally extracted with water at 50°C.

6. Broth Filtrate (B.F.) (Denys). The unheated, unconcentrated, filtered, (through Porcelain) bouillon culture of human tubercle bacilli. Denys believes this to be very much stronger than O.T. (10-100), but Baldwin has proved O.T. far more toxic for guinea pigs.

7. Beraneck's Tuberculin. A 20% solution of equal quantities of the unheated precipitate (by 60% alcohol) of culture of Tubercle Bacilli of standard virulence, on glycerinated, non-neutralised, non-peptonised bouillon, and of an orthophosphoric acid (1%) extract of unheated tubercle bacilli. It is less toxic and less vaso-dilating than P.T. Other Tuberculins which have been used are:

1. Landmann's Tuberculol
2. Salenin (of Klebs) got from Diploccus Semilunaris, which he says is a frequent mixed infection.
3. Tubercle-protein of Klebs.
4. Tuberculo-Sozin.
5. Carl Spengler, bacillus humano bovium.
6. Tuberculase and Tulase, of Von Behring.
7. Oxytuberculin of Hirschfelder.
8. Tuberculo-Plasmin of Buchner and Hahn.
9. Roux's Avian Tuberculin.
10. Moellir's from slow-worm tubercle and Timothy Grass.
11. Rosenbach's Tuberculin, obtained from cultures of Tubercle Bacilli/

Bacilli on which Tricophyton Holoserium Album has been grown.

12. Deyke and Reschad, Tuberculo-Nastin.

13. Marmorek's Serum. Mitchell found good results from Marmorek's serum. He gave 2.5 c.c. hypodermically till anaphylaxis was observed and then 5 c.c by rectal injections daily for from 14 to 21 days. The routine was continued as long as the case demanded.

False Specifics may be defined as agencies which were supposed to be cures, but were not cures, among such methods may be mentioned "antiseptic treatment" which aims at destroying the bacillus and not injuring the tissues.

Bacterio-Therapy (Treatment by antagonistic bacteria) was worked at by Cantani in 1885, but did not meet with much favour.

Organo-Therapy in the treatment of tuberculosis was tried many times. Extracts of various tissues, healthy and tuberculous have been used, the most frequent being lung tissue, lymphatic glands, muscles and blood cells. In 1638, Robert Fludd advocated the injection of sputum for the cure of pulmonary tuberculosis. Other investigators of this form of treatment are Cavagnis in 1886, Lemery and Schroeder, 1897-8; Jaeger and Burnett (Homeopaths); Allan, 1907, etc. There is no record of striking results.

Hemotherapy was first employed by Fiedler in 1870. He used defibrinated blood of immune (or supposed immune) animals, e.g. dogs. Bouchard proved that any immunising properties of blood are contained in serum. Hemotherapy did not create very much sustained interest.

Serotherapy was investigated by Bouchard in 1892 and others. They/

They attempted to get passive immunity by injecting blood of treated animals. The results were not flattering.

Homologus Vaccine treatment was tried by Gerald Webb in 1907, and he claimed good results. He prepared vaccines from the mixed organisms found in the sputum: Pneumococci, staphlococci, streptococci, etc., were frequently found by Webb. He found that:

1. In No case was it harmful.
2. Exacerbations were diminished.
3. Expectoration was diminished and nocturnal coughs frequently disappear.
4. Chronic catarrhal hoarseness frequently disappeared.
5. Concomitant pus affections disappeared in many cases, e.g. suppuration of ears.
6. When combined with Koch's new tuberculin in small doses, spreading infiltrations have been averted, and cleared up.
7. In a case which displayed tubercle bacilli, streptoccus, pneumococcus, staphylococcus, and micrococus catarrhalis, the last was eliminated by an appropriate vaccine and the amount of sputum was very much reduced, from 4 ozs. to 1 oz. daily.
8. Evacuations from cavities in several cases were reduced from 4 to 6 ozs. daily to 1 oz.

The principle of nature cure of tuberculosis by fresh air, sunlight, good food, suitably regulated rest and exercise, etc. has been recognised for a long time. Early pioneers of Hygienic dietetic treatment were Andrew Stewart of Erskine (1747), William Buchan (1783), Benjamin Rush (1794), and George Bodington (1840), of Sutton Coldfield in Warwickshire, and Hugh McCormack in 1855. In Germany, Brehmer and Dettweiler developed the treatment on a large scale. Sanatorium treatment presupposes the possibility of cure. A Sanatorium is an Institution for cure,/

cure, not merely a Sanatarium or health resort. The benefits of putting tuberculous patients in the best possible hygienic-dietitic condition gradually became more widely recognised. Towards the end of the nineteenth century Sanatorium treatment was developed very considerably. Largely through German propaganda, the erection of Sanatoria was the main hope of tuberculous patients and the State. As with the introduction of tuberculin, too much was expected from Sanatoria. The most advanced and unfavourable cases were taken into the Institutions, disappointment resulted, and there was severe criticism. With experience a clearer conception of the true position of this form of treatment was developed. It was realised that a considerable time was required to effect a cure. Not merely three or four months as was at first expected. The longer residence was frequently financially impossible. Another objection was that patients were sometimes mentally disabled from following their former pursuits, after prolonged residence in a Sanatorium. It was found that suitable cases were necessary in order to obtain really good results. Walther improved the method at Nordrach in the Black Forest, and met with great favour. Sanatorium treatment in England developed largely on the Nordrach principle, following Walther's success. Edward Trudrau is a recognised pioneer, and developed the principle in America. The main objects of Sanatorium treatment are:-

1. Cure, arrest, or amelioration of the disease.
2. Education of the patient and his attendants for post-sanatorium care, and
3. Avoidance of infection to other people.

To/

To George Bodington, (vide ante) must be ascribed the honour of being the first on record in England to adopt and advocate treating consumptives by outdoor exercise, abundance of fresh air and generous diet. He published an essay in 1840 on "The Treatment and Cure of Pulmonary Consumption of Principles Natural, Rational and Successful". At that time the disease was considered to be hereditary and incurable. The question of heredity as a cause of tuberculosis is a controversial one. Sir R. W. Philip of Edinburgh says the significance of heredity is not to be discounted, as there can be little doubt of the hereditary transmission of susceptible or less resistant tissues. He says that direct transmission of the disease is uncommon.

Tuberculous people were advised to live in a warm climate if possible. The unfortunate patient was generally kept in a warm room, almost unventilated, with curtains and screens to prevent draughts. The diet was low and he was given anti-phlogistic remedies, e.g. antimony. Bodington deprecated the anti-phlogistic method of treatment, but his work was so severely criticised that further trials on the same lines were discouraged. The prognosis of phthisis at this time was practically hopeless.

Bodington thought that the cause of phthisis was want of tone "in the nervous filaments interwoven with the substance of the lungs and exercising influence over the Capillary system and other parts of the organisation". In 1855, Dr. Henry McCormack of Belfast advocated open windows and plenty of fresh air.

Sir B. Ward Richardson, quoted by Dr. Kelynack in 1904 also advocated out-of-doors treatment. In the early days of Sanatorium treatment/

treatment in addition to fresh air and properly regulated exercise, excessive feeding was insisted on. Large quantities of milk were considered as essential; many patients were unable to take the large amounts of food prescribed, and this part of the treatment had to be modified. Dr. Marcus Paterson at Frimley Sanatorium was a pioneer in recommending "graduated exercise", which has been severely criticised, but has proved valuable when properly regulated. There can be no reasonable doubt that though Sanatorium treatment does not, and cannot guarantee a cure in any case of phthisis, it gives tubercular patients as a rule the best chance they can have of arrest of the disease. The educational part of the treatment is extremely valuable. The writer has seen many phthisical patients who have been in a Sanatorium try to carry out the main principles in their own homes. This, in his experience, is most marked in keeping windows open, and in the disposal of the sputum. Finding suitable work for post-sanatorium patients who are not fit for their ordinary employment is important. "Tuberculous Colonies" have been fairly successful, but at present they are limited in number. This principle is a good one and ought to be developed to a greater extent. For open-air treatment at home, various shelters are sometimes used. Where tents, or other form of shelter are impracticable, porches may be used. They are made outside an upstairs window, large enough to contain a bed and one or two chairs, in fact they are like a small bedroom. Balcony and "window tents" are useful where porches or tents cannot be acquired.

The/

The question of sending advanced and incurable cases of phthisis to a sanatorium for the purpose of avoiding infection at home is a big one, and depends largely on the circumstances of each individual case. There is a good deal of sentiment against sending a person away to die. When there is overcrowding, especially accompanied by poverty, it is highly desirable, and frequently imperative to send the patient away for the sake of the others at home. In the early days of sanatorium treatment, Medical Officers in these institutions complained that many of the patients were not early cases. There are difficulties in finding really early cases. Many patients with only slight and indefinite symptoms think it unnecessary to consult a doctor, and are found later on to have tuberculosis. Frequently the disease is discovered by a practitioner in patients who have advice in an intercurrent or concomitant illness, e.g. rheumatism. General symptoms such as "feeling run down", "weakness", "pains all over", etc., etc., should not be treated lightly, but the possibility of tuberculosis or other serious disease should be kept in mind. Another reason for avoiding a consultation is the fear of hearing an adverse report. This class of patient is generally from a family where one or more members have had tuberculosis. The writer has had a patient who refused to have the sputum examined for tubercle bacilli for fear of what the report would be. Diagnosis of tuberculosis in its early stages is frequently very difficult, if not impossible, in general practice. If there is any suspicion of the disease bacteriology is of great service in helping to arrive at a diagnosis. In many towns a Municipal Laboratory/

Laboratory under the Public Health Department, is available, free of charge, to the patient or practitioner. Radioscopic examination is also valuable, but is not so accessible to a general practitioner. In really early cases of phthisis physical signs in the chest are sometimes very slight. The writer has known a patient (R.B., a boilermaker, aged 37) come to consult him for "coughing up blood", and found there had been definite haemoptysis, although he had remained at work. The physical signs were (as far as the writer could make out at the time) negative, and the bacteriological examination of the sputum for tubercle bacilli was negative. Two years later he developed definite phthisis pulmonalis of a severe type.

Cruice insists that "a cough which has lasted for two months or more and cannot be explained by the presence of some local or general condition, should be looked upon with grave suspicion". He also held that haemoptysis should always be regarded as tuberculous, until proved otherwise. Sir R. W. Philip of Edinburgh looks on haemoptysis as a tubercular condition unless otherwise accounted for. Dr. Shannon of Edinburgh found that a great many cases of pulmonary tuberculosis in children investigated by him, showed a broncho-pneumonic type. He concluded that it either begins with bronchitis, which assumes a tuberculous character, or is tubercular from the outset. This is important because it points to any of the diseases in childhood which give rise to catarrhal conditions in the chest being predisposing causes of phthisis.

Very important pioneer work of an organised, anti-tubercular campaign/

campaign in this country, was begun in Edinburgh by Sir R. W. Philip in 1887, and the Edinburgh system is the model on which other municipalities work. The first step in the system was the establishment of the Royal Victoria Dispensary in 1887, then followed a year or two later the Royal Victoria Hospital, which was pioneer work in Sanatorium treatment. The success of Sir R. W. Philip's measures may be estimated by the fact that during the decennium 1897-1906, the mortality from pulmonary tuberculosis in Edinburgh was diminished by 42%. The broad principles of the Edinburgh system are:

1. The anti-tuberculosis dispensary.
2. The Sanatorium for indigent, curable cases.
3. The hospital for advanced cases.
4. The farm colony for convalescents.

To these Institutions must be added notification, assistance to indigent workers, and their families, etc., etc. Notification of tuberculosis was advocated by Sir R. W. Philip in 1890, but was not made compulsory till 1907.

The anti-tuberculosis dispensary is a most valuable adjunct to Sanatorium treatment, and to private practice. Since the system was introduced by Sir R. W. Philip in 1887, such institutions have spread all over the country. The dispensary is a clearing station where patients with either suspected or definite tuberculosis in any form can be sent for examination, etc. Doubtful cases are investigated, and frequently reports are sent to the practitioner in charge of the case. Definite cases are classified,/

classified, and if considered suitable for hospital or sanatorium treatment, are given the chance of institutional treatment, when possible. The nurses' visits to the houses of patients under treatment at home are highly appreciated and valuable. The examination of contacts is an important part of the dispensary usefulness. In Edinburgh "The March Past" (Sir R. W. Philip's name for an inspection) is valuable in detecting early signs in contacts. A doctor from the dispensary calls at the house of the patient at a pre-arranged time, and examines the contacts, and if necessary refers them to the dispensary for a more complete examination, and if necessary for treatment. The value of the other links of the Edinburgh system are universally recognised. They do not come into a general practitioner's work.

Adjuncts to Sanatoria. Sanatorium treatment means very much more than merely "Open-air Cure". In addition to hygienic-dietetic care, regulated rest and exercise, etc., there are several valuable adjuncts. The anti-tuberculosis dispensary is a great adjunct.

Pneumo-thorax, obtained by introducing Nitrogen gas into the pleural cavity, generally by a fine hollow needle, has proved very useful in suitable cases. The principle is rest to the affected part of the lung, and is analgous to the application of splints to tuberculous joints. It causes collapse of lung tissue. The method is not new. Hippocrates advocated its use as pointed out by Dr. A. K. Krause. He quoted Littre's Second Book on Diseases (Section 59), where he says "If this affection results from a wound, or, as sometimes happens, from an incision for/

for empyema, one should attach a pipe to a bladder, fill the chest with air, and send air into the interior of the chest". Whether Hippocrates used the operation as a therapeutic measure or not is doubtful. The late Prof. John Chiene in his Lectures on Surgery, advised the students "If you want to discover anything new, look into an old book for it". As with tuberculin and sanatorium treatment as such, suitable cases must be selected to get good results. It was noticed that pleural effusion had a good effect in checking tuberculosis of the lung, and it was considered good practice not to remove the effusion unless it was seriously interfering with the respiratory powers.

Forlanini was the first in recent times to use the method in severe progressive pulmonary tuberculosis. At first the operation was limited to cases where the disease was only in one lung, or where the other lung was only very slightly affected, i.e. stages 1 and 2. There should be absence of general pleural adhesions, but it is difficult to exclude this condition. A favourite site for the operation is the 7th or 8th intercostal space in the axiliary line in the hope of reaching the pleura where there are no adhesions. More recently the tendency has been towards a less rigid selection. It has been found that the best results are obtained in "Intermediate" cases: that is, where the disease is subacute, and the other lung only slightly affected. It is considered that for patients with good resisting power it is not required, and that in cases of low resisting power and progressive disease it is unlikely to give a good result. Some authorities advocate limiting the treatment to more advanced cases where other measures/

measures have failed. In some apparently hopeless cases considerable palliation has resulted. Cough and expectoration have been diminished, elevated temperature has come down, and the patients have felt more comfortable generally. The necessity of re-filling the pleural cavity periodically over a period of several years is a drawback, but one which can be overcome. Pleural adhesions are a more serious difficulty.

Thoracoplasty has not been much used in this country, but favourable results have been obtained in Germany, Norway and Denmark, where it is widely used. The object is the same as in artificial pneumo-thorax. Neither artificial pneumo-thorax, or thoracoplasty can be carried out in general practice, except in cases where there is abundant accommodation and the patient is well-off. There is danger of injecting gas into a vein, but this can generally be avoided by fitting a syringe to the needle and aspirating to see if blood is drawn. Deaths have been reported from Nitrogen embolism. In the majority of cases the compressed lung will re-expand, in other cases the lung is converted into a mass of scar tissue.

A serious effusion into the thorax follows in about one-third of all reported cases, and if extensive may have to be tapped, and more nitrogen introduced to replace the fluid.

Another complication is surgical emphysema, which may be either superficial or deep. The most satisfactory method to counteract this is by strapping or bandaging over a pad.

Radiology and Heliotherapy. Sir Clifford Allbutt in an address at the Cripples Hospital and College at Alton, Hants., spoke highly of/

of the value of radiology in the treatment of local tubercular lesions of bones, joints and superficial glands. He spoke favourably of the mercury vapour bath as some substitute for sunlight. The problems of heliotherapy have been worked at, amongst others, by Dr. Rollier of Leysin. Sir Clifford Allbutt was greatly impressed in the early seventies by the beneficial effect of sunlight on tuberculous patients at Davos. He recognised that sunburn was not merely superficial, but "signified a profound alteration within". It has been found that medicinal rays are reflected from the sea with high efficiency. The use of light in the treatment of tuberculous disease has been developed by Sir Clifford Allbutt at Hayling. The conditions of its application have been carefully studied, and its direction, limitation, dosage, etc. have been and are being determined.

Sir Henry Gauvain described some of the methods adopted at Alton. The children lie out in the sunshine naked but for a sun-hat and a loin-cloth, and (in most cases) a splint. Diathermy has been too recently introduced to give reliable statistics.

Drayer's Defatted vaccine promises well, but also is too recent for reliable statistics.

Spahlinger Serum is also too recent for statistical records, and he has not described its composition.

Tuberculin is a valuable adjunct to sanatorium treatment.

Cod Liver Oil is a well-known help in treating tubercular cases either in a Sanatorium or at home. It has a beneficial action on metabolism (increased fat absorption and retention of Nitrogen). Williams, in B.M.J., 1912, ii, 700, thinks it may also have an effect/

effect on tubercle bacilli, by dissolving the fatty envelope which surrounds them.

Skilled Medical supervision and Nursing are essential adjuncts to Sanatorium or any other treatment.

Other adjuncts are:

Suitable drugs and treatment of complications, described later.

Psychotherapy, Hydrotherapy, Postural treatment, Zomotherapy, Radio-Active Iodine and Menthol.

Zomotherapy, or treatment by raw meat juice, was introduced into this country by Sir R. W. Philip of Edinburgh of Edinburgh, who found good results from its use. The method was described by Risbert and Hericourt. They found by experiment on animals that the solid componants of meat have no therapeutic value, although nutritious, but that the expressed juice is of real therapeutic use. They found that it prevented infection with tuberculosis, and that when given to infected animals emaciation was checked and they were frequently restored to health. Cooking destroys the organic or vitamin principles. The juice should be expressed within a few hours after the animal has been slaughtered. It is very unstable, and should be collected in a vessel surrounded by ice, and consumed as soon as possible. From 300 to 500 grams of beef are required daily. This is hardly possible in general practice, except in isolated cases.

Professor Szendeffy introduced treatment by Radio-Active Iodine and Menthol, and thought that by this means it was possible to arrest development of the tubercle bacilli in situ. Bernheim claimed that tubercle bacilli disappeared from the sputum, and that there/

there was great general improvement. The formula is:

Peptonised Iodine	0.75 gr.
Menthol	0.06 gr.
Radium Barium Chloride (Ethel Sol).	0.1 gr.

a series of 40 intra-muscular injections to be given of 1 c.c into the gluteal region. This method is not much used in general practice.

Hydrotherapy is described by Pottenger. While it is based on thoroughly scientific principles, it hardly comes within the province of a general practitioner, except to a limited degree, e.g. sponging, etc.

Pottenger describes the influence of psychotherapy on metabolism. It is certainly an important item in general practice to inspire hope and cheerfulness in patients suffering from tuberculosis or any debilitating disease. It is not only unpleasant, but unsatisfactory, both to doctor and patient if there is no mutual confidence. Depressing emotions have a great influence on physiological activity. The writer has known a patient suffering from asthma, with no special complication, make up her mind that she was going to die. She persisted in this idea, did not respond to treatment and died. We are all familiar with the hopeful, cheerful type of patient whose mental outlook largely helps him to get well. Psycho-analysis is a specialised subject, and only comes into general practice to a very limited extent.

Postural treatment has been recommended by Robertson in suitable cases. The object is to help the drainage of cavities, and prevent, as far as possible, pus retention. The daily routine employed is:

1./

1. Before breakfast, but after he has finished his first morning cough or "respiratory toilet", to put the patient on his right side for twenty minutes.

2. An hour and a half after breakfast he lies for 20 minutes on his left side.

3. Towards the middle of the day, before his mid-day meal, he has 20 minutes lying on his stomach.

4. In the afternoon he is required either to sit up or be on his feet for 20 minutes.

5. Before retiring for the night he is asked to lie on his stomach across the bed with his head supported on his hands on the floor.

This method in its entirety is not suited for patients who are very ill. A certain amount of benefit follows changing the position of the patient, especially in cases of hypostatic congestion

Origin of Tubercle. "The tubercle is produced primarily by multiplication of the fixed cells, especially of connective tissue and of capilliary endothelium, at the site of the localisation of the microbe". That means cellular proliferation.

Points of Entrance. Four distinct modes of entrance must be recognised.

1. Inhalation of bacilli, present in dust or minute droplets of sputum.

2. Introduction into digestive tract by means of food contaminated with bacilli and by other means.

3. Direct implantation on the skin and exposed mucous surfaces through contact with infectious material.

4./

4. Intra-uterine infection through the placental circulation.

Dr. Woods Hutchinson of New York, in his racy little book called "Conquering Consumption", notes in an optimistic way the curability of tuberculous, as evidenced by the discovery of healed tuberculous patches in the lungs at autopsies on patients who have died of other things. He describes "What happens to the bacillus in the body".

The tubercle bacillus "may be sucked directly into the lungs, but is more often caught by and enveloped in the mucous of the nose or throat, and swallowed with it down into the stomach". Woods Hutchinson states that about 8/10 of the bacilli so swallowed are destroyed by digestion. If the bacilli get into the intestine, they are attacked by the "alkaline digestion of the intestines". If the bacilli are not destroyed in the intestinal canal, a great proportion (probably a majority) are evacuated with the faeces. If the bacilli penetrate the intestinal wall, either by slight abrasions, by ulcers, or by the intestinal villi, they get into the lymph glands they are attacked by the leucocytes. If they escape from the lymph glands they are taken by the larger lymph tubes to the vena cava, and by the latter to the heart from which they are pumped into the lungs. In the lungs the bacilli, whether breathed in or swallowed, settle and multiply. The bacilli are attacked in the lungs also, by leucocytes, and small inflammatory patches are formed. "Each little knot of these attacking cells when it becomes large enough to be visible to the naked eye, forms a little shot-like-greyish body, known as a tubercle (little tuber) from which both the disease/

disease and the bacillus take their name. In a favourable case the bacilli are destroyed by the leucocytes, and a small scar results. In an unfavourable case the toxin from the bacilli in the centre of the tubercle destroys the leucocytes, and the tubercle breaks down. A little "abscess" is formed and discharges "pus" into the bronchial tube, and the tubercle bacilli are found in the sputum.

The late Professor John Chiene of Edinburgh, preferred the term "Tubercular liquifaction" to "pus" or "abscess" in tubercular disease. This process on a larger scale forms a cavity.

In many cases fibrous tissue is formed, locking up active tubercle bacilli. In some cases "chalky stuff" follows on the formation of this protective scar tissue. Scars of this sort, apparently at least 20 years old, have been found at autopsies. Scrapings from these old scars have been injected into guinea pigs which died of tuberculosis. Scar formation, with or without, active living bacilli, is the method by which healing occurs in favourable cases.

In describing the effect of sunlight in tuberculosis, W. Hutchinson emphasises its two-fold effect, i.e. on the patient and on the germ. Sunlight increases the resisting power of the patient by "improving his tone and his appetite". He also reminds us that germs belong to the "colorless" class of plants, and that sunlight is a powerful germicide to this class. He insists on absolute rest, and described the improvement in patients with any elevation of temperature, who have what he calls "active rest", or "industrious idleness", or "Day-long blessed idleness". In America/

America they have "camps" which are apparently something like our sanatoria.

Pattenger points out that the progress made in scientific medicine during recent years, has thrown doubt on many well-established ideas, markedly in the field of therapeutics. What he aptly terms "Therapeutic Nihilism" has taken hold on the profession to such an extent, that diagnosis has come to be considered the greatest service we can give to mankind. He does not deny that before therapeutic measures can be adopted with any hope of success, a diagnosis or provisional diagnosis must be made. He says "Any remedy or measure, whether it be of a pharmacopeial, physical or physiological nature, aids to this extent, that it will improve the general metabolic activity of the patient, or stimulate the focus to the formation of scar tissue."

Dr. Percy Kidd says about drugs "The results have not differed greatly, they have all passed through successive stages of exaggerated and hasty laudation, half-hearted approbation and contemptuous neglect". In general practice drugs, are, in most cases, an essential part of treatment.

In treating phthisis, Sir R. W. Philip of Edinburgh emphasises three broad principles:

1. The great curability of the disease in its early stages.
2. The constitutional nature of the disorder.
3. The extreme variability of clinical type.

The success of treatment depends to a large extent on early diagnosis.

The constitutional disturbance is of greater significance than/

than the local lesion.

We cannot formulate a uniform line of treatment for phthisis; each case has to be judged on its merits (Index of treatment by various writers, page 727). Treatment is directed to both the soil and the seed. The soil should, as far as possible, be rendered unsuitable for the growth and development of the tubercle bacillus. Direct attack on the bacillus within the body is not so successful as it is in vitro.

The three great aims of rational treatment are:

1. To increase the natural resistance of the tissues.
2. To oppose the tubercle bacillus more directly.
3. To meet symptoms and complications.

A great many drugs have been used in the treatment of phthisis but few retain favour at the present day. Drugs are generally used as adjuncts to other forms of treatment, especially to hygienic-dietetic methods. Drugs are administered by:

1. The mouth
2. Subcutaneous injection.
3. Intra-muscular injection.
4. Intra-venous injection.
5. Rectal injection.
6. Cutaneous application.
7. Inhalation.
8. Intra-tracheal injection.

The late Sir T. Grainger Stewart thought that inhalation of antiseptics did good in phthisis, but recognised that in many cases the bacilli are not reached. Attempts have also been made to render the atmosphere antiseptic, but the results are not satisfactory. Assiduous inhalation of hot vapour was also unsatisfactory. In laryngeal cases the writer has sometimes found that inhalation of Tinct. Benzoin. Co. has given a certain amount of/

of relief. The method recommended has been 1 drachm of the tincture in 10 ozs. of boiling water placed in a jug, with a table napkin arranged round the top part of the side of the vessel, and projecting above the rim. The patient puts his mouth and nose into the folds of the napkin and inhales the steam. Menthol can be added to the Tinct. Benzoin Co, - 8 grs. of Menthol to 1 oz. of the Tincture, but as good results were found without as with the added Menthol.

Antiseptics, Iodoform and Creosote, have been introduced into the stomach. Again the results were not encouraging.

Another failure was injecting large volumes of Sulphurated Hydrogen into the rectum, and the same applies to subcutaneous injections of Guaiacol. The object was to kill the bacillus in situ.

Cod Liver Oil still retains favour as an adjunct in treating phthisis. The taste and smell of the pure oil are frequently nauseating to patients. Emulsions were introduced by Hughes Bennett. When patients found Cod Liver Oil nauseating, Grainger Stewart found that a little salt added helped, also giving meal afterwards, e.g. oatmeal. He also found lemon peel, malt and Syrups, e.g. Parrish's, useful in modifying the unpleasant flavour. In abdominal affections he advocated rubbing the abdomen with warm oil, hoping that some of it would be absorbed through the skin. Sir Walter Forster gave along with Cod Liver Oil, the following mixture:

Pt. Bicarb	3ii
Acid Hydrocyanic Dil.	Mxvi
Spirit Aetheris	3ii
Aq. ad ℥viii.	

i/

i of the mixture along with the prescribed quantity of oil. His object was to emulsify the oil. The Acid Hydrocyanic Dil. would have an effect on the gastric mucous membrane and on cough and the Sp. Aetheris would stimulate breathing and the cardiac action. Cod Liver Oil is highly recommended by Sir R. W. Philip of Edinburgh.

In the general treatment of phthisis Grainger Stewart recommended Iodoform gr.ii in a pill with gr.i Saccharis Lactis, made up with Glycerin Tragacanth. One pill to be taken three times a day. The idea was that the Iodoform would get into the general circulation and act as an antiseptic. Iodoform is eliminated in all the secretions. It has not been found to be of much use in phthisis. He also recommended pills consisting of Ext. Belladonnae gr. 1/8, Quinin. Sulph gr.1, Confection Rosae 2S, Ut.Ft. Pil. Talis.vi. One pill to be given when required. Belladonna has a good effect on night sweats in addition to its stimulating effect on the respiratory centre. Quinin. Sulph. acts as an anti-pyretic, and a tonic and is also an antiseptic, but the latter effect is not marked in phthisis. He also recommended malt and other forms of alcohol as tonics and stimulants. "Begby's Mixture" was largely used in the treatment of phthisis in the end of the 19th and early part of the present century, and good results were claimed. The formula is as follows:

Acid Hydrocyanic Dil	M40
Acid Nitrii Dil	3ii
Glycerinum	ss
Infus. Quassia ad	

Sig. Cap. ss t.d.s.

The object was three or four fold. Acid Hydrocyanic Dil acts partly/

partly as a cough sedative, and partly as a sedative on the gastric mucous membrane. Acid Nitrii Dil acts as a digestive tonic, and probably has an effect in diminishing night sweats, and a doubtful effect on tubercle bacilli. The principal object of Begby's Mixture was "stomachic". Infus. Quassia is a bitter tonic. Sir T. Grainger Stewart prescribed as a tonic and antipyretic Quinin. Sulph. in gr.v doses, dissolved in Acid Hydrobrom Dil. M10 doses, and flavoured with Tr. Aurant in M20 doses. As a sedative in insomnia he prescribed a pill at night consisting os

Morph. Hydrochlor	gr.i
Atropin. Sulph.	gr 1/40
Pulv. Capsin.	gr.i
Pil. Aloes et Myrrh.	gr.iii

He also recommended Codeia with Atropin as follows:

Liq. Atropin. Sulph.	M15
Syrup Codeia	℥i to ℥ii
Infus. Rosae Acid ad	℥iv

℥ ss t.d.s. as a sedative for cough.

Pottenger considers Atropin an important drug for the relief of distressing symptoms in phthisis. That it is valuable in controlling night sweats is well known, but it has other uses. Whenever increased vagus stimulation is causing harm Atropin is indicated. Grainger Stewart taught that one cause of vomiting in phthisis was vagus nerve affection on the stomach through the lungs. Pottenger considers Atropin valuable in gastro-intestinal complications of phthisis, owing to its action on the vagus.

He also advocated Codiae Jelly for cough in Laryngeal cases. Laryngeal complications are common in phthisis. H. W. Carson says 30% of cases of pulmonary tuberculosis are complicated by laryngeal/

laryngeal tuberculosis.

Grainger Stewart recommended simple demulcients, e.g. Liquorice or Menthol Lozenges for laryngeal cough. For cough in other than laryngeal cases he used

Ammon. Brom.	gr.xv
Syrup. Tolu	M40
Aq. Anethi ad	℥ss

ss to be taken when cough is troublesome.

Another favourite cough sedative of Grainger Stewart's was

Morph. Hydrochlor	gr.i
Acid. Hydrochlor Dil.	Mx
Acid Hydrocyanic	3ss
Syrup Scill.	
Aq. ad	℥i

3i to be taken when cough is troublesome. Landis and Hartz found that oil of Cloves is of benefit in cases with abundant expectoration but useless where there is a dry cough. The writer has used a weak solution of Cocain as a throat spray in a laryngeal case, but the result was not encouraging. Brushing with Cocain was recommended by Sir T. Grainger Stewart. The object was to relieve irritability and so lessen the cough. If ulceration has occurred in laryngeal tuberculosis, Carson recommends frequent application of such drugs as lactic acid, carbolic acid, menthol, formalin, etc, unless the general condition of the patient contra-indicates. If dysphagis is present he recommends insufflation of orthoform. These methods are in most cases impracticable in general practice.

Intra-tracheal or intra-laryngeal injection was recommended by the late Dr. Andrew Smart of Edinburgh in his wards in the Royal Infirmary. Guaiacol was injected into the larynx every 2nd or 3rd day, by a syringe passed through the mouth. It was found to be irritating/

irritating to the patient and difficult to administer and the results were not good. The writer was Dr. Smart's special clinical assistant, and later his House Physician and frequently did these injections.

Sir T. Grainger Stewart thought some relief was obtained by intra-tracheal injection of Olive Oil with Menthol, or for brushing the pharynx, gr.48 in ss. He also recommended insufflation of Iodoform mixed with Starch in laryngeal cases, where cough was troublesome.

As an inhalation Grainger Stewart recommended

Glycerine	3i
Sp. Vin. Rect.	3i
Acid. Carbolic	3ii
Creosote	3ii
Sp. Tenn ad	℥i

M10-20 for each inhalation. As a spray he recommended Acid. Sulphuros M10 in i of water.

Another favourite inhalation in laryngeal cases was

Ol. Pini Sylvestris	3iv
Acid Carbolic	3ii
Ol. Juniperis	3ii
Tr. Benzoin Co	℥i
Aq. ad ℥ x	

M. sig. for inhalation, 1 part to 6 of hot water. Counter irritants were recommended by Sir T. Grainger Stewart for pain.

Sir R. W. Philip of Edinburgh explains how an unlimited supply of fresh air diminishes or prevents a cough. Cough is the expression of irritation, and the source of irritation is frequently the absence of a sufficient supply of air. "The cough may be interpreted as the prayer - or the groan - of the lungs for more air". Surgical treatment of phthisical cavities has had a certain amount of/

of success. Sir T. Grainger Stewart thought it good treatment to cut down a tubercular part of the lung, and use antiseptics locally. Professor Rutherford Morison described the surgical treatment of Phthisis in the Medical Annual 1910.

Surgical treatment of tubercular lungs has been little used since the development of treatment by tuberculin, and the hygienic-dietetic method. Cases for such operations as pneumonectomy have to be carefully selected, and although good results have been claimed by Dr. Forest Williams, and P. L. Friedrich, the value of the operation appears to be doubtful, and it is dangerous. It certainly does not come into the domain of general practice.

Treatment by antiseptic inhalation is of value for distressing cough, but Burney Yeo and Garvy say it must be almost continuous, night and day, the respirator to be worn 22 out of 24 hours. Garvey used Creosote, Carbolic Acid, and Tinct. Iodid. 10 drops every 2 hours on a Yeo's inhaler. He found that all the symptoms were modified; temperature came down, cough diminished, expectoration lessened, weight increased.

Other observers who found the same good results and diminution of the number of tubercle bacilli, and sometimes disappearance were, amongst others, Wilson Fox, Dreschfeld, A. E. Sansoin, and Sir W. T. Roberts. It was an old method revived. Burney Yeo advocated it in 1876. The method is troublesome in practice and is not much used at the present time. In general practice in most cases it is almost impossible/

impossible to get patients to use a respirator practically constantly night and day for 4 or 5 weeks at a stretch.

Attempts have been made to destroy the bacilli in the body without injuring the tissues. With this object in view inhalations, intra-tracheal injections of antiseptics, exhibition of antiseptics by the mouth, rectal injection of Sulphuretted Hydrogen, etc. have been tried.

McElroy reported a case successfully treated with intra-venous injections of Chinosol and Formaldehyde by Maguires apparatus. He gave 33 injections on consecutive days of 50 cc. each of a 1-2000 solution of Formaldehyde with 1-4000 solution of Chinosol. The median basilic or median cephalic vein was chosen as the site. There were no unpleasant local effects, and the tubercle bacilli disappeared. The method was introduced into the Glasgow Royal Infirmary by Napier, who considered the results promising. It is not practicable in general practice unless a specialist is called in.

Mercury has been used for a long time in the treatment of tuberculosis, and the findings of different observers have been somewhat contradictory. Beggs and Peters investigated its value in the treatment of tuberculosis. Peters concluded from the study of 23 cases, that the patients who undoubtedly bemefitted by it, generally have a specific complication. Beggs came to much the same conclusion as Peters, after treating 44 patients with Mercury. Possibly specific complications are more frequent than is generally recognised.

Beggs/

Beggs and Peters were unable to confirm Barton Wright's observations of remarkable resolution of physical signs.

The late Professor John Chiene thought that Mercury had a direct effect in checking the development of tubercle bacilli, and recommended its use along with sea voyages. The writer has used Mercury in several cases of phthisis and found good results. In general practice the most convenient form of administration is by the mouth. He has frequently used Liq. Hydrarg. Perchlor. in M15 doses, along with Liq. Arsenicalis in M 3 doses, and Liq. Morph. Mur. in M 7 doses, and M 5 doses of Tr. Nuc. Vom. If sickness is present, M30 doses of Liq. Bismuth and Ammon Cit. are added, to be given thrice daily. Ung. Hyd. Ox. Flav. is sometimes useful for tubercular glands.

Squire and Kilpatric tested deep muscular injections of Mercuric Succinimede, as recommended by Barton Wright, and found fairly good results. They injected 1/5 gr. in M10 of distilled water, every second day.

Iron has long been used in the treatment of phthisis, but the results are disappointing. Its main action appears to be on the anaemia complicating phthisis; it does not seem to have any action on the tubercular process itself. For general purposes the preparations which the writer has found best are: (i) Ferri Carb. Sacc. in 5 or 7½ gr. doses three times a day, or (ii) Ferri et Ammon. Citrate in 7½ gr. doses, combined with Tr. Nuc. Vom. in M5 doses, thrice daily. Perchloride of Iron is likely to upset the digestion. Syrup, Ferri Phos. cum Quinin/

Quinin et Strych. (Easton's Syrup) is a good general tonic in phthisis, or other devigorating diseases. It is not as a rule irritating to the gastro-intestinal tract.

Pottenger speaks favourably of hypodermic administration of iron in phthisis. A common preparation for hypodermic use is Citrate of Iron, which may be combined with Arsenic.

Hypophosphites are supposed to exert a favourable influence on metabolism, and have a good reputation in the treatment of tuberculosis.

For tubercular children the writer has frequently used Syrup. Ferri Phos. Co. in 3 ss. to 3i doses, but has not found much benefit from it. He has found it more effective when combined with Mi doses of Liq. Arsenicalis. He has sometimes found Syrup. Ferri Iodid. in M40 or 3i doses useful for enlarged tubercular glands in children.

On the whole in the writer's experience, Iron preparations are not of much benefit in the treatment of phthisis. Pottenger uses Bromides in ½ to 1 dram doses for the relief of nervous phenomena associated with menstruation. Pot. Brom. is generally the most reliable sedative of the Bromides, and the writer has never found toxic effects in cases of insomnia. It is sometimes useful in relieving cough also, from its action on the nerves supplying the larynx and pharynx, especially in nervous patients.

It may be objected that the giving of cough mixtures for the relief of troublesome cough, Bromides for insomnia, or nervousness, Chalk for diarrhoea, etc., etc., is treating symptoms/

symptoms. It must be remembered that the relief of symptoms is a very important and valuable adjunct in the treatment not only of phthisis, but of many diseases, and helps nature cure. Bromide of Potassium is also useful in headache, especially combined with Chloride of Ammonium. The writer has frequently found 10 grs. of Pot. Brom. with 7 grs. of Ammon. Chlor. relieve headache or neuralgia. In the general treatment of phthisis the Brompton mixture has been a great deal used, as a sedative for cough, and has a good reputation. The formula is:

Liq. Morph. Mur.	℥ii
Acid. Hydrocyanic Dil	℥ss
Syrup. Tolu	℥ss
Infus. Rosae Acid ad	℥viii.

℥ss three or four times a day.

Heroin Hydrochloride is a Morphia preparation which has been largely used in phthisis, and is most valuable as a cough sedative. The writer has found it depressing in non-phthisical patients, and uses it with care in phthisis. Pottenger strongly recommends it as an effective remedy for cough.

Quinine has been used in phthisis, both as a tonic and as an antipyretic. The latter action is indirect, by diminishing heat production. As an antipyretic, the Sulphate or Hydrochlorate are probably the best preparations. The writer has given Quinin. Sulphate in gr.v doses in phthisis where there was a high temperature without much success. It is easily taken in cachets. An ordinary way of giving Quinin Sulphate in general practice is in ½ or 1 gr. doses dissolved in dilute acid, as a tonic or antipyretic/

pyretic.

For fever in tuberculosis, direct antipyretics are not much used at the present time. Sponging and general care are found to be better. If malaise and aching accompany fever Aspirin, Phenacetin, etc., sometimes give relief. In phthisis, probably Easton's Syrup is the most convenient and satisfactory preparation of Quinin as a tonic.

Opium in one form or another is frequently given in phthisis cases. In haemoptysis, if the patient is nervous, ¼ gr. of Morphine hypodermically relieves nervous shock, and the tendency to cough. The writer has frequently found Liq. Morph. Hydrochlor. useful for relieving cough and diminishing secretions.

Morphia must be used with caution in cases complicated by kidney disease on account of the risk of accumulation.

Pottenger found Codeine useful in the treatment of cough, but prefers Heroin.

Hale White says that Arsenic is without benefit in phthisis. Be this as it may, Arsenic is a very old favourite in the treatment of tuberculosis. Till the time of Landerer it was used as a general tonic or alterative, but he (Landerer) claimed that it had a special action on the tubercle itself, by causing leucocytosis. He used it in the form of Hetol (Succinimate of Soda). It is also used in the form of Sodium Cacodylate, in doses of from 1 to 3 or 4 grs. hypodermically every 2 or 3 days. The preparation of Arsenic which the writer finds the most convenient in general practice is Liq. Arsenicalis or/

or Liq. Arsenii Hydrochlor. in from 3 to 5 minim doses, three times a day. It appears to have an effect in hardening the tissue, and rendering it unsuitable for the growth of bacilli, and in favouring scar formation. It should be avoided in cases complicated by nephritis, on account of the risk of accumulation, and of irritating the glomeruli. It is largely excreted by the urine. In portal cirrhosis, Rolleston warns against the use of Arsenic (which has been used to stimulate the hepatic cells to compensatory hyperplasia) believing that it may cause cirrhosis.

Other contra-indications to the use of Arsenic are:

1. Pregnancy, on account of its abortifacient action. It can also pass from the mother to the foetus.
2. Gastro-intestinal irritation, as it is an irritant to the gastric and intestinal mucous membrane.
3. In advanced cardiac disease on account of (a) its toxic action and (b) the risk of accumulation.

The writer has found Arsenic very useful in phthisis, even in advanced cases, combined with Mercury, Bismuth and Nucis Vomica, (vide ante). The formula he frequently uses is:

Liq. Arsenicalis	3i
Liq. Morph. Mur.	3ii
Liq. Hydrarg. Perchlor.	℥ss
Liq. Bismuth. et Ammon. Cit.	℥i
Tr. Nuc. Vom.	3iss
Aq. Distillat ad	℥viii.

℥ss t.d.s.

Sometimes he uses Liq. Arsenii Hydrochlor. instead of Liq./

Liq. Arsenicalis (in the same doses) to avoid incompatibility. Liq. Arsenicalis is an alkaline preparation. Hydrarg. Perchlor. is incompatible with alkalis and their Carbonates.

Bismuth seems to have an effect in diminishing bronchial secretion where it is excessive, although this action is not generally ascribed to it. It has also a sedative effect on the gastric mucous membrane, and is useful where sickness is troublesome. In the above mixture, Morphia is used for its influence on cough and secretions, and Nuc. Vom. for its tonic action.

By the continued use of the above mixture in favourable cases the writer has noticed a marked improvement in symptoms, and in the general condition of the patient. Cough is relieved and expectoration frequently diminishes after 3 or 4 weeks' treatment. He has noticed a considerable modification in crepitations, even where cavities were present. Cicatrices and adhesions appear to develop as evidenced by physical examination of the chest. Anaemia diminishes, probably partly from the effect of Arsenic, and partly from the general improvement of the patient. If there is elevation of temperature there is not as a rule much diminution till the lung condition begins to improve. High temperature is not a contra-indication to the use of Arsenic and Mercury, although they may have to be stopped in favour of other preparations. He has not noticed much diminution in night sweats by the above mixture, except as a part of the general improvement. Weight also appears to be/

be unaffected except as part of the general improvement. Arsenic is specially indicated if Anaemia is marked. He sometimes continues the mixture for 6 or more months and then gives the patient an interval of 2 or 3 weeks without it. In the intervals, if there are no urgent symptoms, he has found a mixture of Pot. Chlor. in 7½ gr. doses, with Tr. Nuc. Vom. in M5 doses, a useful general tonic. Pot. Chlor. gives nascent oxygen very easily, which may or may not have a beneficial effect. If cough is troublesome Heroin, Codeia, etc., etc., can be used. He has sometimes found an Acid expectorant mixture useful, e.g.

Acid. Nit. Mur. Dil	℥ii
Tr. Camph. Co.	℥vi
Oxyeunt Scill.	℥ii
Aq. Chlorof. ad	℥viii.

℥ss, t.d.s.

The above is useful also where thirst is troublesome and where the tongue is dry and parched.

The writer has continued the administration of Arsenic with Mercury sometimes for 2 or 3 years in chronic phthisis cases, allowing intervals without the mixture of 2 or 3 weeks every few months and stopping it in the case of urgent symptoms, e.g. gastro-intestinal irritation or nephritis. As part of the general treatment he has never found any bad effects, but pigmentation sometimes occurs. Along with any medicinal preparation he recommends Cod Liver Oil in emulsion, whenever the patient can take it.

Creosote has been largely used in the treatment of phthisis. It is supposed to have a deterrent effect on the development/

development of bacteria in the gastro-intestinal tract, and to have an antibacilliary effect and guard the patient against intestinal infection. Some authorities have thought it has a direct action on the tuberculous tissue in the lung. It is eliminated through the bronchial mucous membrane, and probably has some useful local influence in phthisis cases where there is bronchial catarrh. It is unpleasant to take in a mixture. The writer has used it in Mi or Mii doses in capsules, with very doubtful benefit. Capsules are probably the easiest form for internal administration. It is commonly used as an inhalation (vide inhalations). Pottenger recommends its use combined with Oil of Eucalyptus and Chloroform where cough is troublesome, and for cases of fœtid bronchitis and abscesses of the lung.

For the night or sleep sweats (or illness of any kind) the best treatment is prophylaxis. In this connection Pottenger advocates correction of depressive emotional states, which have an effect on the sympathetic nervous system. Toxaemia from organic causes probably cannot be avoided, but functional conditions which have an effect in causing sleep sweats, can be at least very much modified, e.g. discontent, fear and worry. He emphasises the advantage of putting the patient in the open air for stimulating appetite, etc., apart from the other advantages of open-air treatment. In short he advocates treating symptoms, and any obvious cause of night sweats, in the hope of diminishing them. Hydropathy is valuable on/

on account of the tonic effect on the skin.

For active treatment of sweating, sponging with tepid water alone, or with vinegar, is comforting to the patient, and Atropin given internally is valuable (vide ante). Care should be taken to avoid chill after severe sweats. Nursing is of the utmost importance.

Pain, apart from either pleurisy or the pulmonary inflammatory process, is frequently due to reflex neuralgia, and sometimes to neuritis, which is frequently due to toxaemia. Sometimes after severe coughing there are muscle pains. Of course tuberculous patients are also liable to pain, the same as other people, e.g. toothache, colic, etc., etc. For pain due to toxaemia, e.g. from local infection from intestinal stasis, carious teeth, etc., the cause should as far as possible be removed, e.g. by purgatives, mouth hygiene, etc., and rest. If the pain persists, medicinal preparations should be resorted to, e.g. Bromides for toothache, aromatics and sometimes opiates for pain of intestinal origin.

For neuralgias and neuritis, heat, dry or moist, is valuable. Counter-irritation is sometimes useful, e.g. blisters, or painting with Iodine. Blisters, in cases of phthisis, should be used with caution, on account of the lowered vitality of the patient.

For pleuritic pain an opiate is generally the best. A hypodermic injection of 1/8 gr. or more of Morphine is indicated. In acute pleurisy, Pottenger advocates strapping the chest. Other preparations which have been found useful are/

are Heroin, Codein, Dovers Powder, Aspirin, Phenacetin, or acetanilid compounds. Acetanilid is a cardiac depressant, and should be used with caution. Pain from whatever cause should, if possible, be relieved in phthisis, as it has a reflex influence through the sympathetic nervous system, depressing the functional activity of various organs, and thus affecting metabolism.

Insomnia is sometimes a distressing symptom in phthisis. If due to a special organic cause, e.g. pain from pleurisy, etc., appropriate remedies must be used (vide ante). If due to functional causes, e.g. worry, fear, etc., sometimes psychotherapeutic measures may prove of benefit. Sometimes hot or cold compresses to the abdomen have been found successful. Sponging also is useful. Trional, Sulphonal, etc., etc., have all been tried and have a better effect if taken with a hot drink.

The writer has used Bromide of Potassium in 15 to 20 gr. doses, to be repeated if necessary in 3 hours, and found it of benefit in insomnia. Alcohol, in the form of $\frac{1}{2}$ oz. or more of whisky, in warm water, repeated in 2 or 3 hours if necessary, is also of value in some cases. Sometimes the ingestion of food, e.g. a biscuit with milk, will help a restless patient to go to sleep.

For haemoptysis, Sir R. W. Philip of Edinburgh recommends opiates, with the double object of calming the patient and restraining cough. He has found very good results from:

Pulv./

Pulv. Ipecac. Co.	gr. iv.
Hydrarg. with Cretae	gr. i.

For use every 2 to 4 hours while bleeding continues.

To lower blood pressure where it is high and there is severe haemorrhage, the inhalation of Amyl. Nitrite is sometimes of benefit. For small and continuous haemorrhages small doses of Nitroglycerin or Nitrite of Sodium have been found useful. Saline purges are of service in reducing blood pressure. If the pressure is unusually high, ½M doses of tincture of Aconite have been found serviceable. Calcium Salts have a reputation for helping coagulation. He also emphasises the benefit of open air.

Sir R. W. Philip considers that 60% of phthisis cases show haemoptysis at one or other time. He finds that it may occur at any age, but is less common before puberty. It may occur at any stage of the disease. In his experience haemoptysis is less likely to occur under open-air treatment. Haemoptysis, although very alarming to the patient and attendants, is not necessarily a very bad symptom. Sometimes a sense of relief is found after haemoptysis. This is more likely if there is a mitral lesion complicating the disease. If severe, or repeated, anaemia may supervene, which may prejudice the patient's chance. In the case of a sudden copious haemorrhage there is a danger of collapse, and even death from suffocation. In haemoptysis K. Zehner and Volland strongly advocate hypodermic injections of Camphorated Oil. Volland injected from 25-30 gr. of 10%. Zehner gives moderate doses of 20%, and has scarcely ever known it to fail.

For/

For haemoptysis Grainger Stewart recommended quiet, ice to suck and astringents. Some authorities recommend Digitalis on account of its effect on slowing the heart's action. Dr. Smart in the Royal Infirmary, Edinburgh, used Ext. Ergot. Liq. in 10 or 15 M doses, sometimes larger doses, along with Liq. Morph. Mur. in 5 or 7 M doses, or Tr. Opio in 7M doses. The results were satisfactory. An objection to Ergot is that it raises blood pressure, and so in theory would be harmful. We never found toxic symptoms follow its use in the wards. Probably the opiate given with it countered that effect.

Adrenalin and Pituitin have been tried for haemoptysis but have been found disappointing. Atropin is indicated and has been found valuable. W. R. Grove recommends intra-muscular injections of Calcium Chloride for haemoptysis and good results are claimed.

Horse serum given subcutaneously has been recommended by D. C. Martin in the New York Medical Journal, 1917, II, 738. It is not a practical method in general practice because of (i) the difficulty of obtaining the fresh serum: and (ii) the danger of anaphylaxis.

In phthisis complicated with tuberculous disease of the intestine, Grainger Stewart used pills of Cupri. Sulph. gr. ½, Ext. Haematoxylon 2S, Ext. Opii gr.¼, Ut.Ft. Pil. Sig. 1, t.d.s. The constituents of the pill indicate what it was meant for, namely astringent and sedative. He prescribed suppositories of:-

Morph. Hydrochlor.	gr. 1/6
Ergotin.	gr. iv
Ol. Theobrom.	Qs.

Ut./

Ut. Ft. Suppositoria. To be used when pain or discomfort was severe, or if there was diarrhoea, or haemorrhage from the bowel. For diarrhoea he prescribed:

Bismuth Subint.	℥ss.
Acid Hydrocyanic Dil	M40.
Syrup. Zingil	℥ss.
Infus. Gentian Co. ad	℥vi.

Sig. ℥ss, t.s.s.

Subintrate of Bismuth was generally preferred to Carbonate or Salicylate of Bismuth in Edinburgh in the last part of the last century, and in the early part or the present one, probably because it is heavier and is a better dusting powder.

In cases of phthisis complicated by vomiting, Grainger Stewart had great faith in medicinal Naptha, in Mv doses, with compound tincture of Cardamons in 3i doses, with water to ℥ss, to be taken when nausea is felt. Vomiting is frequently distressing in phthisis and may be due to:

1. Stomach affection through the vagus nerve from the lungs.
2. Catarrh of the stomach.
3. Irritation about the back of the throat.
4. Sometimes to stress of coughing.
5. Laryngeal.

He also prescribed Napthalen Capsules. It must be remembered that in the "early nineties" tuberculin was not in favour. Whitla writing on the disappointment following the high hopes of Tuberculin being a specific says: "At the present moment most medical men and many patients and their relatives look back upon it as a huge nightmare. Whitla, although/

although he observed very bad results from Tuberculin protested against the general condemnation, and thought further trials should be made. Results have proved that he was right. Sanatorium treatment was just beginning to be developed. Drugs at this time held an important place in the general care of phthisical patients.

In emaciation, Grainger Stewart recommended, in addition to careful dieting and God Liver Oil, enriched milk. Enriched milk was obtained by chopping suet fine, putting a tablespoonful into a muslin bag, placing in ½ pint of fresh milk, and heating gently for a few minutes. Some of the fat of the suet filtered through the muslin, and was absorbed by the milk which was thus made richer. Patients generally take it well and do not find it nauseating.

In cases of phthisis complicated by kidney disease, the prognosis is very grave. Grainger Stewart found medicines of little or no use in these cases, but in some cases he thought surgical treatment was successful. The late Francis D. Boyd recommended Tuberculin in suitable cases of unilateral kidney disease after operation. Dillingham reported favourably on the use of Tuberculin in tuberculosis of the kidney and bladder.

In cases of phthisis complicated by tubercular cystitis, washing out the bladder with Boracic Lotion or weak Pot. Permang. solution (about 1 in 5000) may give relief. Pot. Cit. in 20 gr. doses with Tinct. Hyocyanim in 3ss or 3i doses 3 or 4 times a day, may relieve the symptoms. A mixture of Acid. Boric. gr. 7 with Liq. Morph. Mur. M 7 with Aq. Chlorof. to ℥ss, taken 3 or

4/

4 times daily may give relief. The writer has frequently found the above mixture very useful in non-tubercular cystitis.

If phthisis is complicated by affection of the reproductory organs of either sex, the treatment is mostly surgical.

If tubercular meningitis complicates phthisis the prognosis is almost hopeless. Very little can be done in the way of treatment. Grainger Stewart recommended Potassium Iodide with Ammon. Carb. and counter-irritants, but he found no benefit except palliation.

The writer has seen lumbar puncture relieve temporarily urgent symptoms, e.g. fits in young children. He has used Potass. Brom. with Pot. Iodid, but found little or no relief from medicines.

Complications of bones and joints in phthisis are usually treated on Surgical lines.

CONCLUSION.

There are several outstanding landmarks in the study and treatment of phthisis since the time of Hippocrates. Galen probably recognised its infective character. Another advance was the association of tubercles with "consumption," by Sylvius. Koch's discovery of the Tubercle Bacillus in 1882 is probably the most important landmark, as it gave observers something definite to work on. It also led to the discovery of Tuberculin. Bodington's/

Bodington's Essay advocating fresh air treatment was an important step, but was not followed up as it should have been. The substitution of hygienic-dietetic treatment, tuberculin, etc., for the antiphlogistic method is a very great advance. The introduction of anti-tuberculosis dispensaries in 1887, followed shortly afterwards by the impetus to Sanatorium treatment is another important landmark. Notification is an advance in prophylaxis and in educating the public.

Artificial pneumothorax fills an important niche in the therapeutics of the disease. Early diagnosis of phthisis is easier than it was even 20 years ago, largely due to Bacteriology, etc. Patients come under treatment sooner with a better chance of recovery. Recognition of the fact that a great many, probably the majority of cases of phthisis, are curable, inspires hope.

Treatment by drugs has largely been superseded by other methods. In the writer's experience, drugs are valuable adjuncts in home treatment. In many cases of phthisis they appear to have a curative effect, as he has frequently noticed considerable improvement. In advanced and hopeless cases they act as palliatives.

They is no specific known for tuberculosis, like Salvarsan in syphilis, Antitoxin in diphtheria and Quinine in Malaria.

The whole anti-tubercular armamentarium is available for treatment, and we hope that the time will come when the mortality from this dread disease will be as low as from smallpox, typhoid fever, diphtheria and appendicitis.

APPENDIX.

NOTES OF CASES.

In the following record of cases treated by the writer, he has adopted the classification described by Sir R. W. Philip in his address in Medicine delivered at the 77th Annual Meeting of the British Medical Association.

Stage 1. Disease of slight severity, limited to small areas of one lobe, which, for example, when affecting the apices bilaterally, does not extend beyond the spine of the scapula, and the clavicle; or unilaterally, does not extend below the second rib anteriorly.

Stage 2. Disease of slight severity, more extensive than Stage 1, affecting at most an entire lobe, or of greater severity extending at most over half a lobe.

Stage 3. Disease of greater extent than just defined, and all cases with considerable cavities.

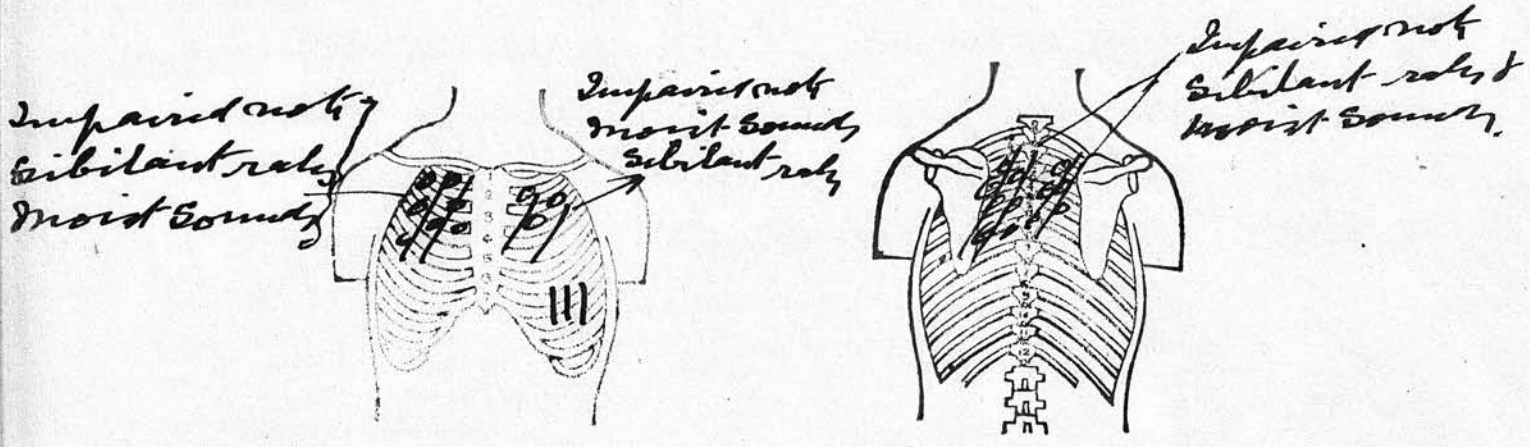
The writer wishes to express his indebtedness to Dr. W. H. DICKINSON, Tuberculosis Officer of Newcastle-upon-Tyne, for kindly allowing him access to notes on his patients who have been examined at the anti-tuberculosis dispensary.

May 31st, 1923.

LILY HUDSON, aged 22 11/12 years,

Shop Assistant.

Height 5 ft. ½". Weight 89 lbs.



Complained of cough and spit, dyspnoea and loss of weight. No night sweats nor haemoptysis. Duration - cough since January, 1923.

HISTORY: Family - Family history does not show tubercle.

Personal - Abscess behind left ear in childhood. No history of any serious illness. In January, 1923, she had a "cold" followed by a cough and spit and has not been well since.

EXAMINATION: General. Flushed and thin. Temperature 100, pulse 140. Right pupil larger than left.

Respiratory system. Percussion note is impaired over each upper lobe, with a few moist sounds and sibilant rales, also some crepitations over the upper part of lower lobes. There is no evidence of laryngeal/

geal affection. Sputum is copious and contains numerous tubercle bacilli.

Haemopoictic System: Anaemia.

Other systems show nothing of importance.

Diagnosis Phthisis pulmonalis in 3rd stage, of an acute type.

Prognosis rather bad.

TREATMENT: Advised as to food, rest and fresh air. She was given at first a mixture of

Ammon. Carb.	3iss
Tr. Nuc. Vom.	3iss
Tr. Camph. Co.	3vi
Aq. Chlorof. ad	℥viii

℥ ss t.d.s.

The above was stopped and later she was given

Ferri Ammon. Cit.	3ii
Tr. Nuc. Vom.	3iss.
Aq. Chlorof. ad	℥viii

℥ ss t.d.s. Ex. Aq. D.C.

In the latter part of June the Iron mixture was stopped and she was given

Liq. Arsenii Hydrochlor.	3i
Liq. Hydrarg. Perchlor.	ss
Aq. Chlorof. ad	℥viii

℥ ss t.d.s.

She was also given Emulsion of Cod Liver Oil.

PROGRESS. On June 6th, 1923 her weight was 90¼ lbs. Temperature 97.4, pulse 144. She felt well. She was advised to go to the Tuberculosis Department of the City Hospital for Infectious Diseases, but would not go. She was still going about.

In the end of June and first fortnight in July she was worse, and had temperatures ranging from 99.4 to 101. The Arsenic/

Arsenic and Hydrarg. mixture was continued, also the Emulsion. In the 2nd half of July the temperature was generally normal, cough and expectoration were diminished, and she was able to go about again. Appetite fairly good.

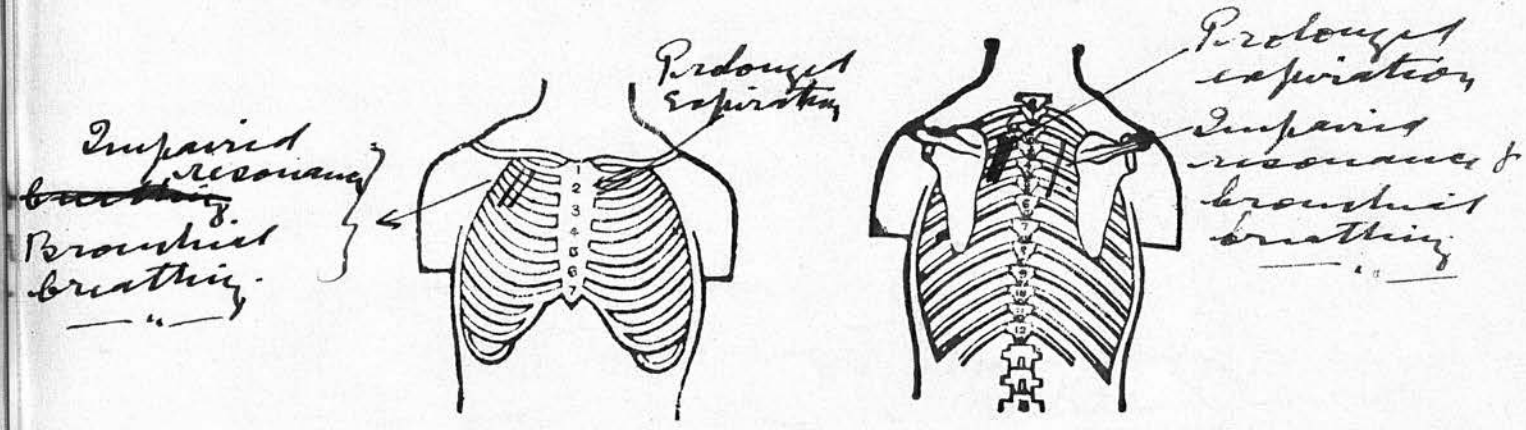
In August, 1923, she remained much the same as in the 2nd half of July. The chest condition was a little better than in June and the early part of July, with fewer adventitious sounds.

At the present time, September 12th, 1923, she is anaemic, but feels much better, and she is able to go about in comfort. She has dyspnoea on exertion.

18th October, 1920.

ROGER BURNS, aged 36, BOILERMAKER.

Height 5ft. 2½".
Weight 129 lbs.



Complains of cough and spit, haemoptysis, loss of weight, and weakness. He also complained of pain in the left side near the costal margin. No night sweats. Duration - recent.

HISTORY: Family history, a brother aged 30 died of phthisis.
Personal, he had a mild attack of influenza 5 years ago, with some bronchitis.

EXAMINATION: General: well nourished, rather pale; temperature 98.4; chest slightly contracted.

Respiratory system: percussion note was impaired over right apex.

Auscultation: breathing was bronchial over right upper lobe, and expiration was prolonged over left upper lobe. No crepitations nor other adventitious sounds were heard. Sputum was copious but examination for tubercle bacilli was negative. There was not much cough.

The/

The other systems did not reveal anything of special interest.

A diagnosis of phthisis pulmonalis in the first stage was made, with a fairly good prognosis. He was advised to go to a Sanatorium but did not go. He was working at this time. The treatment adopted was on general lines as regards food, rest and fresh air. He was given an acid expectorant mixture. He did well and remained at work till May, 1922. He still complained of the pain in the left side. The sputum was examined for tubercle bacilli four times and was negative.

In May, 1922, he had another attack of haemoptysis, which passed off in two days. The physical signs were much the same as in October, 1920. In May, 1922, he went into the Royal Victoria Infirmary and remained there for four weeks. When he came home he was troubled with vomiting and was given the following mixture:

Bis. Carb.	3iii
Sodii Bicarb.	3iii
Tr. Zingil Fort.	3ss
Infus. Gentiam Co. ad	℥viii.

℥ ss t.d.s.

Cod Liver Oil emulsion was also recommended but the sickness prevented him from taking it.

In June, 1922, there were crepitations over the right apex and right base. He remained fairly well till September, 1922, when he had another attack of haemoptysis. His weight was not ascertained at this time, but he was losing ground. His temperature was normal, appetite poor and general strength low. He was now in the third stage of phthisis. His medicine was changed from time to time. He was given Sodii Cit. gr. XV, with Nuc. Vom. MV thrice daily. Cough was troublesome and expectoration copious.

In/

In June, 1923, he had another haemoptysis, not severe. The sickness was very troublesome.

In July, 1923, tubercle bacilli were found in the sputum. He was now given

Liq. Arsenii Hydrochlor	3i
Liq. Morph. Mur	3ii
Liq. Hydrarg Perchlor.	ss
Liq. Bis. et Ammon. Cit	i
Tr. Nuc. Vom.	i
Tr. Nuc. Vom.	3iss
Aq. Distillat ad	℥viii.

℥ss t.d.s.

He was also advised to persevere with the Emulsion of Cod Liver Oil, and was able to take small doses without being sick. In August, 1923, he had a severe attack of diarrhoea, and was given the following mixture:

Cretae Praeparat	3iiss
Sodii Cit.	ss
Ammon Carb.	3iss
Tr. Chlorof. et Morph.	3iss
Mucilage	2.S
Aq. ad	℥viii.

℥ss every four hours.

The diarrhoea stopped in 2 or 3 days. In September, 1923, he was put back on the Arsenic and Hydrarg mixture.

At the present time there is extensive disease over the whole of the right lung, and he is going down hill. His weight has not been ascertained but he is very thin.

The prognosis at the present time is bad, and the treatment palliative.

Points of interest in this case are the slow development of the disease in its early stages, the practical absence of physical signs for/

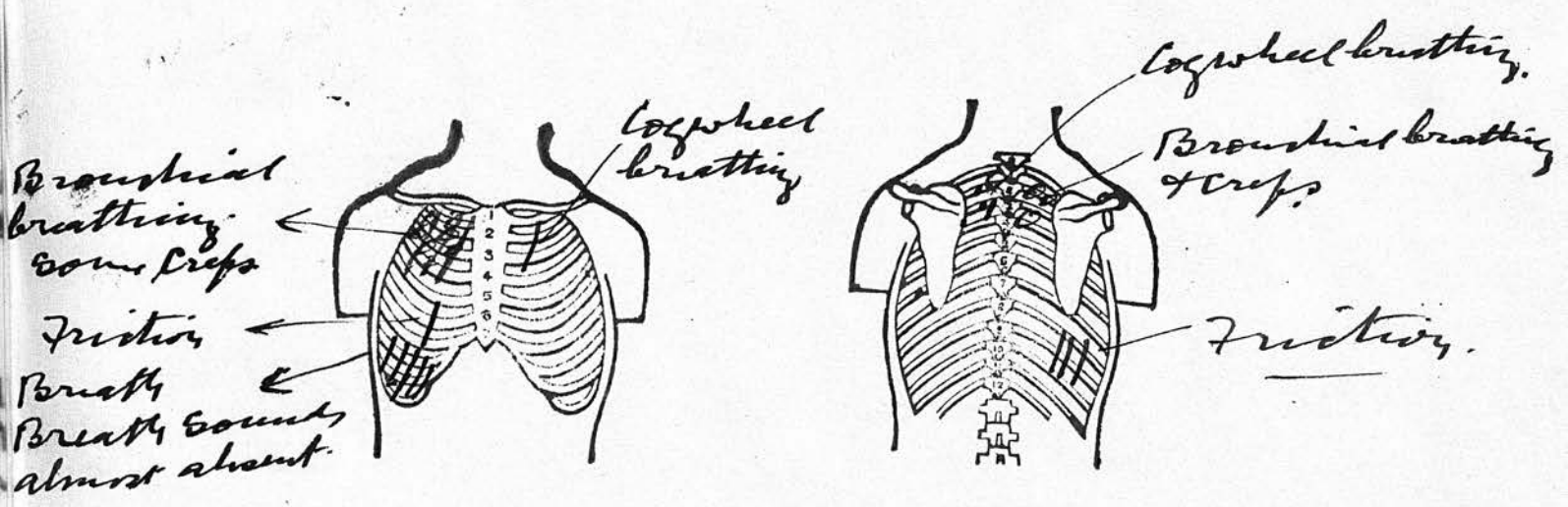
for from 1½ to 2 years after the first Haemoptysis, negative reports for tubercle bacilli till the disease was advanced. Another point of interest is the persistent pain in the left side without appreciable physical signs. The pain is probably due to adhesions.

April, 21st 1921.

ELEANOR JOICE, Nee MARSHALL.

aged 22, Dressmaker.

Single when ill, now married. Height, 5ft. 5¼", weight, 112 lbs.



Complains of cough and spit, night sweats, loss of weight, weakness, dyspnoea, and pain in right side. Duration - cough and spit for six weeks.

HISTORY. Home surroundings are fairly good. Not a tubercular family history.

Personal. She had a mild attack of influenza in 1919, otherwise has had no serious illness.

EXAMINATION. General - Rather frail, but well nourished. Temperature, 98.

Respiratory System. Percussion note is impaired at each apex, especially/

especially the right in front, and much impaired at right base. Sputum was copious and contained tubercle bacilli.

Auscultation. Breath sounds are of cog wheel type over left upper lobe, bronchial over right upper lobe with some crepitations. There is friction in right infra-axillary region. Crackling sounds over right base where breath sounds are almost absent.

Circulatory System. Pulse 116, no bruits.

Urinary System. Reaction neutral, Albumen present. She had no symptoms of kidney disease.

Other systems. Showed nothing of special interest.

Diagnosis. Phthisis pulmonalis in second stage.

Prognosis. Guarded.

TREATMENT. Rest, good food, and fresh air. Also Cod Liver Oil Emulsion and at first an Iron tonic. Later she was given

Liq. Arsenii Hydrochlor.	3i.
Liq. Morph. Mur.	3ii
Liq. Hydrarg. Perchlor.	3ss
Liq. Bis. et Ammon. Cit.	℥i
Tr. Nuc. Vom.	3iss.

Aq. distillat ad ℥viii.

℥ss t.d.s.

PROGRESS. On April 28th, 1921, her weight was 106 lbs. Temperature 99.6. Pulse 120. Temperature at night was 100 or 100.4.

There was laryngeal affection. The mucous membrane of the arytenoids was red and congested, but showed no evidence of ulceration. Cough was troublesome, but the patient felt fairly well.

On June 9th, 1921, her weight was 104 lbs. Temperature 98.6, pulse 130. The cough was troublesome, but she said she was/

was improving.

On June 25th, 1921, she was admitted to Barrasford Sanatorium, where she stayed for nearly 5 months. She was discharged on November 12th, 1921. When she was in the Sanatorium she made uninterrupted progress and was on the longest walks before she was discharged. After discharge treatment was resumed as before.

On November 15th, 1921, she was found to be very much improved in her general condition. Weight 124¼ lbs. Temperature 98.4, pulse 120. In the chest the percussion note was impaired over the upper and lower right lobes and the breath sounds were diminished. A few crepitations were heard in the right upper and lower lobes. There is slight drooping of the right shoulder.

On June 15th, 1922, her weight was 122¼ lbs. Temperature 98.6, pulse 120.

The chest signs were much as in November 1921. She was, however, looking well and feeling well, and no tubercle bacilli were found in the sputum.

After June 1922 she went to work as a shop assistant. The cough had practically disappeared and the expectoration was small. Night sweats seldom troubled her.

In July 1923 she came to report to the writer. She was looking well and feeling well and had been married.

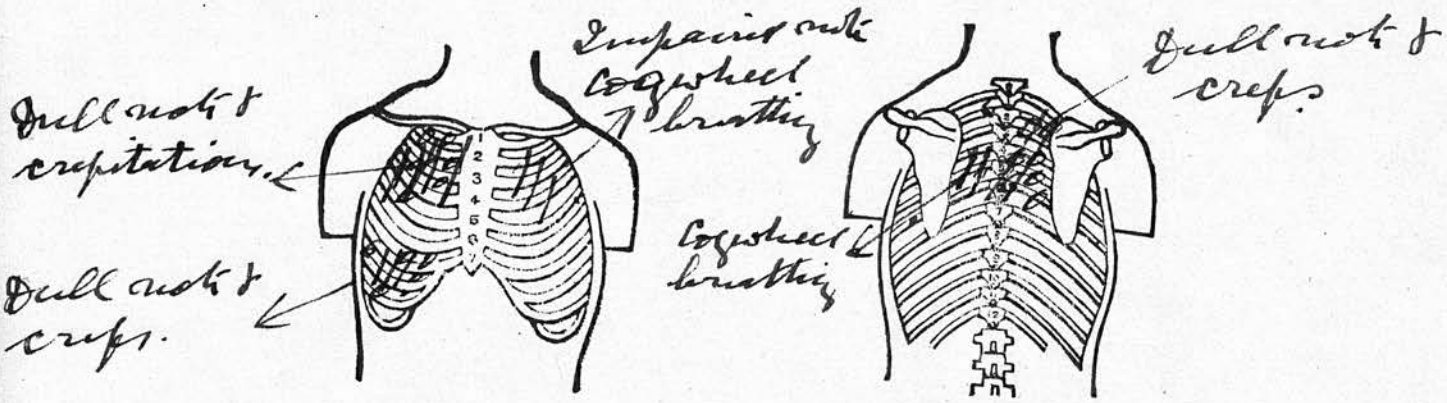
This was a case which looked badly at the beginning. The anti-tuberculosis dispensary, the Sanatorium and home treatment/

treatment were all brought to bear on the condition. The educational aspect of the dispensary and of the sanatorium were marked in the case. The result is satisfactory.

5th May, 1913.

FREDERICK ERNEST PARR, aged 34, POTTER.

Height 5 ft. 6½", weight 122¾ lbs., married.



COMPLAINED OF cough and spit, night sweats and weakness. He also had dyspnoea. No haemoptysis. He had pain in both sides.

Duration - about 2½ years. Home surroundings poor.

He was in Barrasford Sanatorium for 98 days, from December 23rd, 1911, till March 30th, 1912.

HISTORY. Family - Not tubercular.

Personal - In 1910, he had a severe attack of lobar pneumonia, and has never been strong since.

EXAMINATION: Chest is flat and contracted.

Percussion note was much impaired over the right upper and lower lobes, and less so over the left apex.

Auscultation:/

Auscultation: breath sounds were tubular over the upper and lower lobes of the right lung, and there were many crepitations. Over the left upper lobe the breath sounds were of cogwheel type, but no crepitations were heard. Larynx was not appreciably affected. The cough was troublesome, the sputum was copious and contained tubercle bacilli.

Circulatory System: Heart was drawn over to the right side.

Alimentary System: Appetite was poor and the tongue was ulcerated.

Other systems showed nothing of special interest.

DIAGNOSIS: Phthisis pulmonalis in second stage.

Prognosis rather bad.

TREATMENT: As much good food and fresh air as he could get. Cod Liver Oil Emulsion, and a mixture of

Liq. Arsenii Hydrochlor.	3i
Liq. Morph. Mur.	3ii
Liq. Hydrarg. Perchlor.	℥ss
Liq. Bis. et Ammon. Cit.	℥i
Tr. Nuc. Vom.	3iss
Aq. distillat ad	℥viii

℥ss t.d.s.

PROGRESS: During 1913 he was able to continue at work, and the chest condition did not alter appreciably.

On April 29th, 1914, his weight was 118½ lbs., temperature 100. Cough was very troublesome and expectoration copious. The chest signs did not alter much. He continued at work most of the time till August. His temperature varied from 98.8 to 101, but was seldom above 99.4 The Emulsion and mixture were continued. In September the mixture was stopped and he was given an acid expectorant mixture for a month, after which the Arsenic with Hydrarg./

Hydrarg mixture was resumed.

On May 7th, 1915, his weight was 117 lbs., temperature 99, pulse 80. He had not been able to work for a few months and was not very well fed. He was troubled with vomiting after meals at times. He was able to go about.

In July, 1915, the Arsenic and Hydrarg. mixture was again stopped for a month and he was given a general tonic; the emulsion was continued. In September the Arsenic and Hydrarg. was resumed. On March 31st, 1916, his weight was 122 lbs., temperature 98.4, pulse 104. He was feeling better but not able to work. The chest condition was much as before. In July, 1916, he had severe pain in the right side, with friction sounds. His temperature went up to 101, and varied between 99 and 101. He was in bed for about a fortnight and was able to go about a little. He remained in much the same state during the rest of 1916.

On March 30th, 1917, his weight was 117 lbs., temperature 97.6, pulse 116. His heart was now drawn further to the right. There was considerable pigmentation of the skin. He was sick at times and his appetite was poor. There appeared to be considerable increase of adhesions in the chest, but not many more crepitations. He remained in much the same state till September, 1917, when he had another attack of pleurisy, and was confined to bed for 10 days. He was able to go about a little. The Arsenic and Hydrarg. mixture was stopped for 6 weeks from the middle of September till the end of October, and he was given Pot. Chlor. in $7\frac{1}{2}$ gr. doses, with Tr. Nuc. Vom. in M 5 doses, thrice daily. The Emulsion was continued. In November, 1917, he was given the Arsenic and Hydrarg. mixture/

mixture again for 4 weeks. In the early part of 1918 he was very poorly and confined to the house. His weight was not ascertained then, but he was evidently thinner. His general condition was poor, appetite bad, sputum copious and cough very troublesome.

From March to the end of June, 1918, he remained much the same. After June he went rapidly downhill. Dyspnoea was marked, cough bad and sputum copious. He continued the Emulsion and was given a palliative mixture which had little or no effect. In November, 1918, he had abdominal pains and at times diarrhoea. He died on December 18th, 1918.

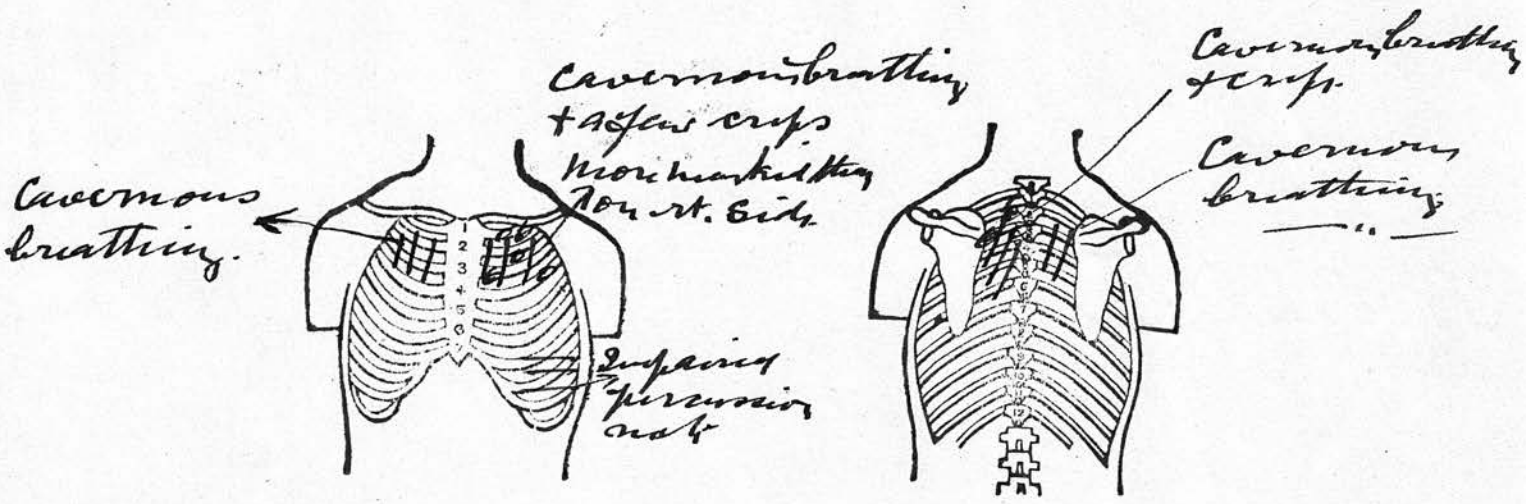
The outstanding features in this case were its extreme chronicity, and the very extensive adhesions, and the partial recovery from several attacks of distressing symptoms. He may have had pneumonokoniosis from inhalation of dust.

February 9th, 1920.

DAVID HORNSBY, aged 43,

Labourer at Chemical Works.

Height 5 ft. 11", weight 124¾ lbs., married, home surroundings fair.



Complained of cough and spit, night sweats, loss of weight, dyspnoea and weakness. He also complained of pain in chest and side.

Duration: He said he had had a cough and spit every winter for 14 years.

HISTORY: Family - not tubercular.

Personal - Pleurisy in left side 25 years ago. Bronchitis and muscular rheumatism 5 years ago.

EXAMINATION: General. Tall and thin, looked poorly. Voice was husky, temperature 99.2, pulse 120, fingers clubbed.

Respiratory/

Respiratory system. Hollows under clavicles, chest prominent in front. Vocal fremiture and vocal resonance were increased over left upper lobe. Percussion note was impaired over apeces especially the left, and left base.

Auscultation: Breath sounds were cavernous at each apex. A few crepitations were found over left upper lobe after coughing: breath sounds were feeble over right middle and lower lobes. Cough was troublesome and sputum copious, and contained tubercle bacilli.

Urinary system: Albumen was present.

Circulatory system: The heart appeared to be dilated and drawn to the left side, the apex beat was 1" external to the nipple line.

Other systems did not show anything of special interest.

DIAGNOSIS: Phthisis pulmonalis in the 3rd stage, with cavitation at the left apex, the disease being complicated with nephritis

Prognosis: Rather bad.

He objected to the C.H.I.D. tuberculous department, and was not considered a suitable case for Sanatorium treatment, and so was treated at home. He was under the writer's care for several months previous to February 9th, 1920, and was given Acid Acetyl. Sal in 5 gr. doses thrice daily, for relief of the rheumatoid pains from which he suffered. In February, 1920, he was advised to rest and have as good food and as much fresh air as he could get. He was also given Cod Liver Oil Emulsion and a mixture of

Sodii Bicarb.	ʒiii
Spt. Ammon Aromat.	ʒiii
Infus Gentian. Co ad	℥viii

℥ss t.d.s.

The above mixture was continued till June, 1920, when it was stopped and/

and he was given Pot. Chlor. gr. v. with Tr. Nuc. Vom. M v. thrice daily. The Emulsion was continued. He was able to go about, but unfit for work.

PROGRESS. He continued much the same for a year. In March, 1921, he developed a severe pain in the lower part of the abdomen, mostly on the right side. There was some rigidity of the abdominal muscles and appendicitis was feared, but the symptoms passed off with hot applications and castor oil. Cough was troublesome and he had dyspnoea. The chest signs were much the same as in February, 1920. He was in bed for 10 days with abdominal pain and was then able to be up and about a little. The mixture and Emulsion were continued.

On June 13th, 1921, his weight was 139½ lbs., temperature 97.8, pulse 98. He was feeling much better. He frequently sat outside the door in fine weather. The albuminaria persisted. He remained fairly well during the rest of 1921.

In February, 1922, he developed severe pains in the toes of the left foot, and they became swollen and congested. The condition of the toes suggested gangrene. He was kept in bed for a few days and the foot was enveloped in cotton wool. The pain and swelling gradually disappeared, and he was able to get about again. He remained in much the same condition during the rest of 1922.

In January, 1923, he told the writer he had been taking Olive Oil for some months past, in addition to the Emulsion and medicine. It did not appear to have any marked effect.

From January to the latter end of May, 1923, he was fairly comfortable. He was able to take considerable walks in the park when the weather was fine. He had dyspnoea on exertion, cough was troublesome/

troublesome and sputum copious. There was no appreciable difference in the lung condition. In the end of May, 1923, he had severe diarrhoea and sickness, and was confined to bed and became very ill In the first week in June there was marked increase in the lung conditions. Crepitations developed extensively over each base, and there were marked signs of cavities at the left apex. For the sickness and diarrhoea he was given Cretae Praeparat. in 10 and 15 gr. doses with Sodii Citrae in 15 gr. doses, thrice daily, but it had little or no effect and he died on June 17th, 1923.

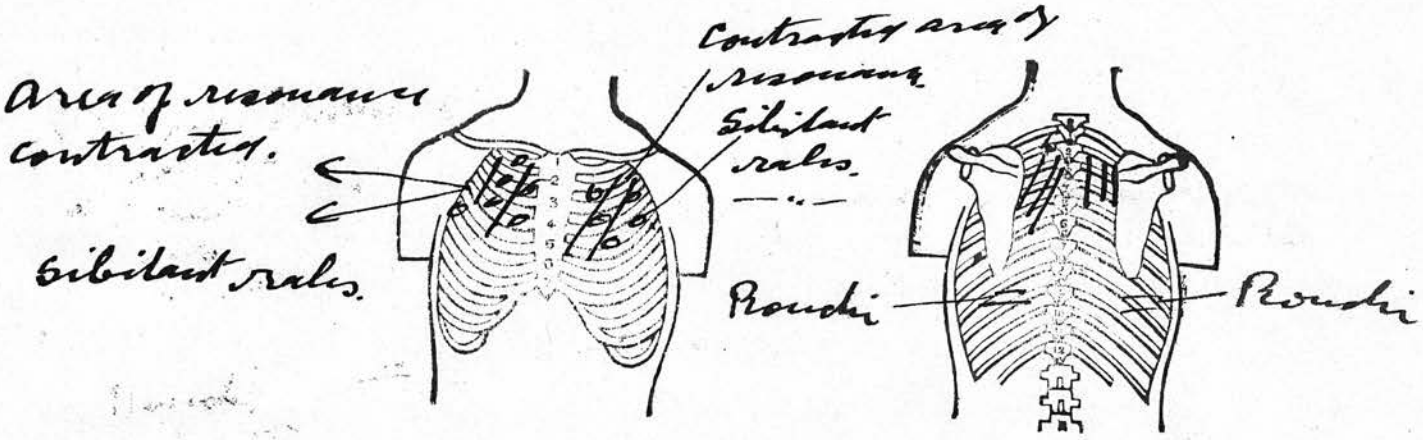
This was a very chronic case, and despite the complications he did very well.

May 17th, 1922.

JOHN THOMAS CONNOR, aged 45,

Woodcutting Machinist.

Height, 5 ft. 5½", weight 118 lbs.



Complains of cough and spit, loss of weight and weakness and dyspnoea. No night sweats nor haemoptysis.

Duration - Cough and spit for 8 months.

HISTORY: Family - His father died of bronchitis. His daughter, aged 9, had an abscess on her arm. No definite tubercular family history.

Personal - He has been alcoholic. 4 years ago he had a fistula in ano, and there is an ischio-rectal abscess scar. In January, 1922, he had a mild attack of influenza.

EXAMINATION: General: He is high coloured, only moderately nourished, temperature 98.

Respiratory System: The chest is somewhat flat.

Percussion:/

Percussion: Contracted area of resonance over apeces especially on left side.

Auscultation: Breath sounds somewhat faint on left side, with prolonged expiration. On deep inspiration sibilant rales were audible over each upper lobe, and there were wheezing sounds accompanying forced expiration. Ronchi were heard over the bases and breath sounds were diminished in intensity. Sputum was copious and tubercle bacilli were found to be present.

Circulatory System: The arteries were thickened, no murmurs were heard.

Alimentary System: Teeth were bad, tongue coated. His appetite was good, but he was constipated.

Other systems showed nothing of importance.

DIAGNOSIS: Phthisis pulmonalis in 2nd stage with bronchitis.

Prognosis: Not good.

The home surroundings were not good. He remained at work.

TREATMENT: Advice was given about food and fresh air and he was given a stimulating expectorant mixture. He was also given Emulsion of Cod Liver Oil. Later he was given

Liq. Arsenii Hydrochlor	3i
Liq. Morph. Mur.	3ii
Liq. Hydrarg. Perchlor.	℥ss
Liq. Bis. et Ammon. Cit.	
Tr. Nuc. Vom.	3iss
Aq. Distillat Ad.	viii

℥ss t.d.s.

PROGRESS: On September 20th, 1922, his weight was 125½ lbs. Temperature 98.4, pulse 84. He had very little cough and was able to remain at work. He had dyspnoea on exertion. The chest condition was much the same as in May, but his general condition had improved and he/

he felt better. The mixture and Emulsion were continued.

On March 7th, 1923, his weight was 120 lbs. He had only a slight morning cough, and the breathing was much easier. His temperature was 97.4 and pulse 88. The lung condition had improved; slight dullness at apeces, no adventitious sounds, he was breathing much easier. The Arsenic and Hydrarg. mixture was stopped and he was given

Acid Nit. Mur.	Dil	3ii
Tr. Camph. Co.		3ii
Oxymel Scill.		3ij
Aq. Chlorof ad		3viii

℥ ss t.d.s.

In June, 1923, he was feeling much better, and looked well. The chest condition was satisfactory and the sputum examination was negative for tubercle bacilli.

On August 29th, 1923, his weight was 113¼ lbs., temperature 97.4, pulse 104. He had been out of work for several months, and was probably not well fed. He was not so well. He complained of pains in the left side of the chest. There was rather more sputum and it was slightly blood stained. Examination of the chest showed no adventitious sounds. The percussion note at the apeces was much impaired especially on the left side. Expiration was prolonged over the left apex. He was given Easton's Syrup in 3i doses, t.d.s. and continued the Emulsion of Cod Liver Oil.

September 12th, he has not reported for a fortnight, but the writer believes that he is able to go about and is making satisfactory progress.

Interesting points in this case are that although there was considerable/

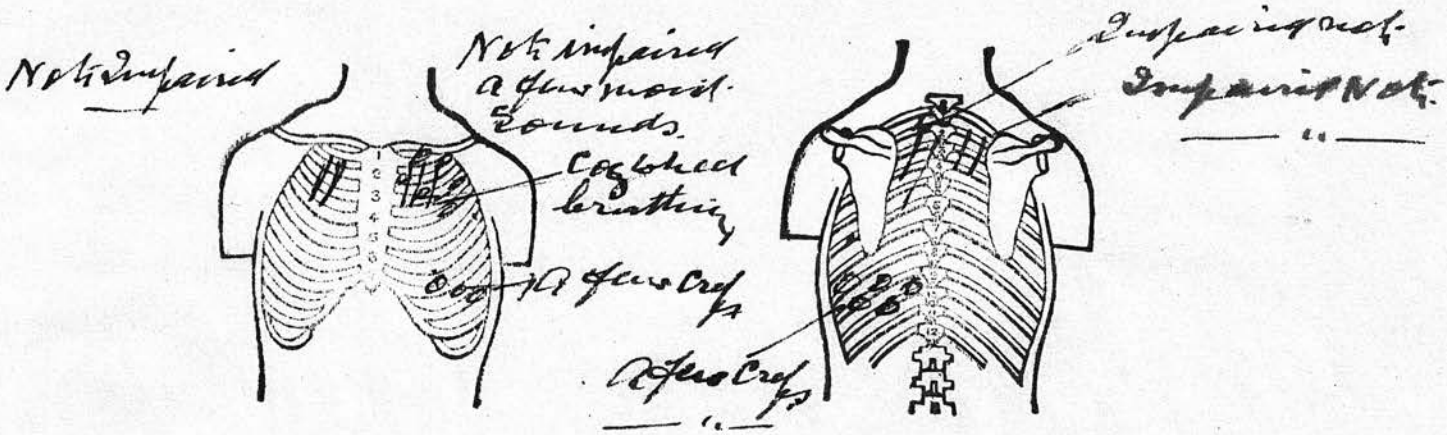
considerable affection he has been able to work nearly all the time since the disease was diagnosed, without any institutional treatment. He receives home treatment from the writer, and is under the supervision of the dispensary.

April 25th, 1922.

MARGARET FORD, aged 34,

Housewife.

Height 5 ft. 4¼". Married. Weight 104¼ lbs.



DURATION: She dates her present illness from January, 1921, when she had a severe attack of influenza, with bronchitis, and had had a cough and spit ever since. In the summer of 1921 she had a severe pain in the right side, and in her back. 12 years ago she had "nervous debility", but there is no definite record of this illness. She was in the Union hospital.

In April, 1922, she had a troublesome cough with copious expectoration, night sweats, loss of weight, dyspnoea, vomiting, and was very weak. The sputum contained tubercle bacilli, and a diagnosis was made of phthisis pulmonalis in the 3rd stage, with a/

a rather bad prognosis.

There is not a tubercular family history, but her son has enlarged glands.

On examination in April, 1922, she was thin and looked hectic. Her temperature was 97.

RESPIRATORY SYSTEM: Flat chest. Percussion note much impaired over each upper lobe, especially the left.

AUSCULTATION showed bronchial breathing at each apex, with very few moist rales. Inspiration was of the cog-wheel type, below the left clavicle. There were a few crepitations over the left lower lobe.

ALIMENTARY SYSTEM: Tongue was dirty and appetite poor.

CIRCULATORY SYSTEM: Pulse 112: no bruits: Heart beat was somewhat weak.

In the other systems nothing of special interest was noted. The finger nails were curved. The catamenia were regular but scanty. She objected to go to the City Hospital and was treated at home. The home surroundings were not good; 9 people lived in 2 rooms and they were not well off.

The treatment advised was rest, as much good food and fresh air as she could get, and Cod Liver Oil Emulsion. She was also given

Liq. Arsenicalis	3i
Liq. Morph. Mur.	3ii
Liq. Hydrarg. Perchlor	℥ss
Liq. Bis. et Ammon. Cit.	℥ i
Liq. Nuc. Vom	3iss.

Aq. destillat ad [illegible] ℥ss tds

On May 2nd, 1922, her weight had fallen to 97¾ lbs. The temperature was 97.2, pulse 140, and she felt very weak. She was confined to bed later in the month and was in bed about 6 weeks. In August, 1922, she was a little better; she had less cough and very/

very little sputum. Her weight on August 3rd had increased to 103 lbs. Temperature was 99, pulse 128. On September 6th, 1922, she went to the Wingrove Hospital, and remained there 53 days, being discharged on October 28th, having been in bed all the time. The Wingrove Hospital is under the guardians' administration but is not limited to pauper patients. She left the hospital against medical advice. When she came home she was a little better and able to go about in comparative comfort. The same home treatment as before was begun again.

On November 11th, 1922, her weight was 109¼ lbs., temperature 97, pulse 120. She had not much cough or expectoration, and her general condition was satisfactory. She remained fairly well and was able to go about till the summer of 1923.

On February 1st, 1923, her weight had fallen to 100 lbs, temperature 98, pulse 120. In the chest the percussion note was impaired over the left upper lobe, and also over the left base. Crepitations, numerous, were heard over both the upper and lower left lobes, and a few over the right upper lobe. She does not complain of night sweats often. She felt much better and had very little cough and spit. Her general condition was satisfactory.

On May 1st, 1923, her weight was 102 lbs., temperature 99, pulse 112. She had very little cough and was "feeling much better", and was able to do her own housework. She had dyspnoea on exertion. From May till the end of July she remained fairly well and was able to go about in comparative comfort. She was not taking the medicine regularly and did not report regularly. In the middle of August, 1923, she turned worse and had to go to bed. There were crepitations/

crepitations at each apex and dyspnoea was very marked. She was given a stimulating expectorant mixture, Ammon Carb. Gr. v. Tr. Chlorof. et Morph. M.v., Tr. Lobelin M.10, every 4 hours and advised to continue the Cod Liver Oil. She developed abdominal pains with slight ascites, and looked very ill. The above mixture was stopped and she was given Pot. Iodid. in 7 gr. doses with a bitter infusion.

In the beginning of September, 1923, she had insomnia and was given Pot. Brom. in gr. xv doses, three times a day with a bitter infusion, and ss whisky with hot water at night.

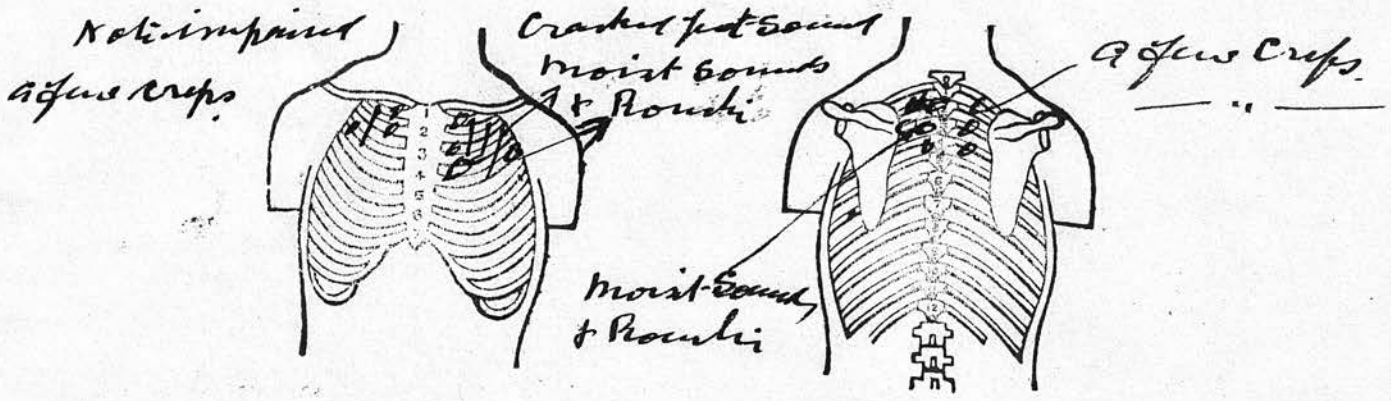
Now, September 10th, she is still confined to bed, but feeling better. The abdominal pains have gone and the ascites is much less. Her appetite is poor, she sleeps better. The acute symptoms are passing off.

Points of interest in this case are the marked improvement which took place in her general condition without increase, but rather with loss of weight; and the comparatively little advance in the chest signs and symptoms when abdominal complications supervened.

15th August, 1919.

CHRISTINA LEVENY, Single, age 18.

Occupation	Clerk.
Height	5 ft. 3¼".
Weight	99½ lbs.



In August, 1919, she complained of cough and hoarseness, and that she was getting thinner.

History: There was a family history of phthisis.

PERSONAL: History of pneumonia (probably broncho-pneumonia) in childhood and of influenza in June, 1918. Has not been strong since. Home surroundings are not good. Examination temperature 99.8, pulse 110. She was rather thin.

Respiratory system: Chest was flat and she was somewhat round shouldered. Vocal resonance was increased in left upper lobe.

Percussion: Dull over left upper lobe with "cracked pot" sound. Note is slightly impaired at right apex.

Auscultation: Moist sounds and ronchi over left upper lobe, and a few crepitations over right upper lobe. The left Vocal cord is congested and the right Ary-epiglottis fold is congested and swollen./

Sputum was copious and contained tubercle bacilli.

Circulatory system: No bruits.

Haemopoietic system: Anaemia.

Reproductory system: Periods were regular with less discharge than normal.

In the other systems there was nothing of importance to record.

A diagnosis of phthisis pulmonalis in the second stage was made with a guarded prognosis. The treatment advised at this stage was as good food and as much fresh air as she could get. She was also given Emulsion of Cod Liver Oil and a mixture as follows:

R/

Liq. Arsenii Hydrochlor.	3i
Liq. Morph. Mur.	3ii
Liq. Hydrarg. Perchlor.	℥ss
Liq. Bis. et Ammon. Cit.	℥i
Tr. Nuc Vom.	3iss
Aq. Distillat ad	℥viii

Sig. Cap. ℥ss t.d.s.

PROGRESS: She remained much the same for two months and went to the country for a few weeks. She was admitted to Barrasford Sanatorium on November 11th, 1919. She remained at the Sanatorium for 334 days and was discharged on October 14th, 1920. When she was in the Sanatorium she developed a ischio-rectal abscess which burst and healed satisfactorily. After that she improved rapidly. She was able to go for walks, but did not work. When she came home from the Sanatorium her pulse and temperature were normal, and she looked well and felt well. Her weight was 118 lbs. On examining the chest the signs were not so marked and there were fewer adventitious sounds. The same home treatment which she had before she went to the Sanatorium was resumed. She/

She kept under treatment for about three months and after that did not come regularly for treatment and advice.

In May, 1921, she went to work as a clerk. She remained fairly well during the summer, but did not report regularly. On November 10th, 1921, her weight was 110½ lbs., temperature 99, pulse 88. She was feeling well. During 1922 she kept her ground and remained at work. She did not report regularly. In September she had some patches of psoriasis on her knees and elbows, which caused her some trouble. She used some antiseptic lotion and dressed the patches with Ung. Zinc. Oleas and Paraffin Molle in equal parts with a satisfactory result. The bacteriological examination of the sputum for tubercle bacilli was negative.

On November 8th, 1922, her weight was 112 lbs., temperature 98, pulse 120. There was no evidence to account for the rapid pulse. Examination of the chest showed restricted movement over the left side. Over the left upper lobe the breath sounds were feeble and there were some crepitant sounds, also a few crepitations over the left lower lobe. The right lung appeared to be free from adventitious sounds. The heart was found to be drawn to the left side, with the apex beat 1½" outside the nipple line.

In May, 1923, her weight was 108 lbs., temperature 97.4, pulse 112. She felt well and had very little cough and no night sweats.

She has not reported lately, but the writer believes she is still working.

In this case all the anti-tubercular processes which were available/

available were used, viz:- the dispensary, home treatment, a country holiday, sanatorium treatment, and when she came home, more home treatment and supervision at the dispensary.

BIBLIOGRAPHY.

Bandelier & Roepke . . . Tuberculin in Diagnosis and Treatment.

British Medical Journal . . . July 21, 1923.

Chiene, Prof. John . . . Lectures, 1899-90.

Encyclopaedia Medica - - - Vols. 7 & 12.

Hutchinson, Woods - - - Conquering Consumption.

Klebs - - - Tuberculosis.

Many Authors - - - Control & Eradication of Tuberculosis.

Many Writers - - - Index of Treatment.

Medical Annual - - - 1910, 1912, 1913, 1914, 1919, 1922.

Medical Rec. -- - Vol. 2.

Newsholm - - - Prevention of Tuberculosis.

Osler & Macrae - - - System of Medicine, Vol. 3.

Pathological Anatomy, - - - 1842.

Pottenger - - - Clinical Tuberculosis.

Proceedings of Royal Society of Medicine, 1904.

Pye - - - Surgical Handicraft.

Robertson, Aitchison - - - Medical Jurisprudence, Toxicology and Public Health.

Stewart, Sir Thos. Grainger - - - Lectures, 1892-3.

Sydenham, New Society - - - Vol. 173, 1901.

Tidy - - - Synopsis of Medicine, 3rd Edition.

White, Hale - - - Materia Medica, Pharmacy, Pharmacology and Therapeutics, 16th Edition.

Whitla - - - Dictionary of Treatment, published in 1894.